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TELEPHONE ENGINEER

MANAGEMENT • ENGINEERING • MAINTENANCE

Vol. 43, No. 6 **June, 1939**

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A Magazine devoted to the interests of the entire telephone industry—operating men and manufacturers.

SERVING THE FIVE BILLION DOLLAR TELEPHONE INDUSTRY

Founded in 1909

Office of Publication, Pontiac, Illinois. Executive and Editorial Offices 7720 Sheridan Road, Chicago, Illinois. Phone Rogers Park 3040. J. A. SMITH, President and Treasurer; RAY W. SMITH, Vice-President and Editor: L. M. BERRY, Vice-President; D. WEINER, Secretary Subscriptions: U. S., Cuba, Mexico, $1.00 Per Year; Canada, $1.50; In all Other Countries, $3.00. Single Copies, U. S. A., 15 cents. All Subscriptions should be sent DIRECT to 7720 Sheridan Road.

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TELEPHONE ENGINEER
MANAGEMENT • ENGINEERING • MAINTENANCE

JUNE, 1939

"Tapping In" On Washington

By ROLAND C. DAVIES
Editor
Telecommunications Reports

WHILE there is practically no likelihood of Congressional consideration at this session, the Final Telephone Investigation Report of the Federal Communications Commission, which was featured by its recommendation to establish a basic cost cacounting system for the Western Electric Company, is of great signifiance because it forecasts the course of future Federal telephone regulation in a number of important phases of the telephone industry.

Unanimously approved and signed by all seven Commissioners, the report was sent to the Senate and House Interstate Commerce Committees which have charge of FCC legislation. FCC Chairman Frank R. McNich in sending the report to the Senate and House pointed out that it had been "unanimously approved" and was signed by himself, and Commissioners T.A.M. Craven, Frederick I. Thompson, Norman S. Case, Thad H. Brown, Paul A. Walker and George Henry Payne.

A feature of the Final Report was the substantial reduction in the number of legislative recommendations in comparison with the Proposed Report which was submitted at the conclusion of the $1,500-000 Telephone Investigation on April 1, 1938, by Commissioner Walker. The outstanding rejection of the Proposed Report proposals was the elimination of the recommendation that the FCC should have the power to approve, review and disapprove the management policies of the American Telephone and Telegraph Co. and the Bell System—this was considered the most far-reaching policy ever advanced in telephone regulation.

Another potential expansion of the FCC's regulatory power in the Walker Report, which would have given the Commission authority to regulate costs and prices of telephone apparatus and equipment, was also eliminated and the right to prescribe a basic cost accounting system for Western Electric was substituted. The cost accounting legislative recommendations would authorize the FCC to prescribe "basic cost accounting methods to be followed by manufacturing companies under contract with operating telephone companies for the general supplying of materials or equipment, and by manufacturing companies subsidiary to or affiliated with operating companies through corporate structure." While the language of this provision would appear to limit the accounting system regulation to Western Electric Co., it was believed that the FCC may endeavor to have the accounting system procedure broadened to take in Independent Telephone Manufacturing Companies.

OTHER important legislative recommendations submitted to Congress were:

"To require approval by this Commission for, and as a condition precedent to the issuance or refunding of any securities of corporations which offer telephone service subject to this Commission's jurisdiction." (This would give the FCC the same powers that the ICC possesses over railroads and the Power Commission has.)

"Amend Section 201(a) for the Communications Act to clarify this Commission's jurisdiction over the division of joint interstate rates per se." (This proposal involves an interesting issue, whether state commissions would have a voice in this regulation.)

"Amend Section 202(b) so as to make it clear by specific language rather than by implication that practices, classifications, regulations and facilities, as well as services and charges, in connection with the use of wires in chain broadcasting shall be subject to regulation by this Commission and so that this section of the Act will correspond to the preceding half of the section, 202(a)."

"Amend Section 214(a) of the Act to prohibit the abandoment of any interstate line operated by any carrier subject to the Act without authorization from this Commission." (This would incorporate the railroad principle of abandonment of lines in the FCC regulations.)

Wage-Hour Legislation at Standstill

Hopes of Congressional action on the Wage-Hour amendments at this session are being dimmed by the failure of both the Administration and farm bloc Senate and House supporters to make any move in regard to the legislation.

After the defeat of the second attempt of Chairman Mary Norton in the House to secure suspension of the rules action on her measure, which would have exempted telephone exchanges with less than 500 stations, the House farm bloc had indicated that they would seek an open rule from the House Rules Committee which would mean the Wage-Hour bill could be considered with any amendments from the House floor. It was planned to increase the telephone exemption to 800 stations. However, the House farm leadership has delayed seeking this rule and there have been rumors that the farm organizations may be willing to postpone any action until next session. At any rate, unless some move is made in the House to revive the bill in the near future, the adjournment of Congress around July 15 may doom the measure from going through the House and Senate due to the actual question of time needed for committee study, debate, voting and conference action.

Amend Section 221(a) so as to make the application for consolidations of telephone companies subject to the Act mandatory (Section 221(a) now makes filing of such application optional.)"

"Amend Section 221(a) so as to require approval by the Commission of all acquisitions by one company of the stock or voting stock of another company for purposes of control."

"In the event of the refusal of any common carrier utility engaged in interstate communications to license others upon reasonable terms under any patents obtained in connection with communication service to the general public as a common carrier utility, the Commission should be empowered, upon the application of parties so refused, to order the issuance of such license; provided that the granting will not be detrimental to the communication service rendered by the utility holding such patents and not detrimetanl to technical progress."

"It is suggested that the Congress give consideration to the question of assessing the cost of regulation against the industry to be regulated."

Congress Told of Important Need of Increased Federal Regulation

In regard to many other phases of telephone regulation, such as depreciation, license contract costs, separation of property, intercompany transactions, pension expenses, the Commission report declared that "a general framework of statutory authority has been provided for the regulatory efforts of this Commission in the telephone field. The FCC, however, informed Congress that in order to tackle these regulatory problems as well as the proposed expansion of its telephone functions it would have to have sufficient funds to establish a staff of trained experts. The Investigation had produced a large amount of fundamental data and background upon which "adequate future regulations of interstate telephone operations may be sucessfully founded and positive cooperation may be afforded to the various state regulatory authorities." The FCC report stressed that the Federal Commission not only had an important responsibility in the regulation of interstate rates but also was able to be of great assistace to the State Commissions."

"The mandate" of the Congressional resolution ordering the $1,500,000 investigation" has now been complied with," the FCC report stated. The report continued that its document "is belived to present for the first time for the use of Congress and the American people a fully rounded and inclusive picture of the history, development, magnitude, present status, and operating practices of the telephone industry in this country" with particular reference to the Bell system. The report noted that the high integration of the Bell System may simplify the problem of telephone regulation but "likewise imposes upon the regulatory authorities an unusual reponsibility in one of the most difficult and complex fields of governmental effort."

The FCC Report of approximately 900 mimeographed pages, which covered every major phase of the history, development, magnitude and operating practices of the telephone industry, especially the Bell System, represented a large number of deletions and revisions of the Walker Report on the basis of the corrections and criticisms contained in the Comments and Briefs, filed with the FCC by the American Telephone and Telegraph Company and Bell System. As a whole, however, the Commission's Final Report took the same form and retained a majority of the material of the Walker Report. To illustrate the latter situation, Commissioner Walker issued a statement at the same time the Final Report was released in which he "expressed gratification that the Commission approved the Proposed Report in principle and largely in substance."

Language of Final Report Is More Temperate

In general, the language of the Final Report was somewhat more temperate in its analysis of the past activities and operations of the A. T. & T. and Bell System that was contained in the Special Investigation document, the Proposed Report. The innuendos and censorious criticism in the Proposed Report had been, in many instances eliminated. The FCC staff, which undertook the revision of the Proposed Report, deleted or revised the language in a great many places in the Final Report and, where a set of facts or charges which did not appear to be substantially proved was retained, the Final Report language cited that such material was secured by the Investigation staff or words to that effect. This crediting of material to the Special Investigation staff occured in numerous places in the Final Report so that, when such data is before Congress, the source will be clearly demarked.

ON A NUMBER of important regulatory questions, such as depreciation, pensions, competitive bidding on telephone apparatus and division of tolls, the FCC in its report presented the various viewpoints on these issues in a factual way and then informed Congress that such matters would be pursued further with Commission studies. In regard to competitive bidding, the report presents both the advantages and disadvantages of such a step. A hasty review of the FCC report indicated that there here some variances in the positions and findings taken in the different portions of the Report, such as between the General Summary and Findings and the de-

(Please turn to page 37)

Convention Schedule

Washington Independent Telephone Association, Mont Cristo Hotel, Everett, June 23 and 24.

Oregon Independent Telephone Association, Portland Hotel, Portland, June 26.

California Independent Telephone Association, Miramar Hotel, Santa Monica, June 29 and 30.

Michigan Independent Telephone Association, Hotel Olds, Lansing, July 26 and 27.

R. V. Achatz to Lead Hoosiers

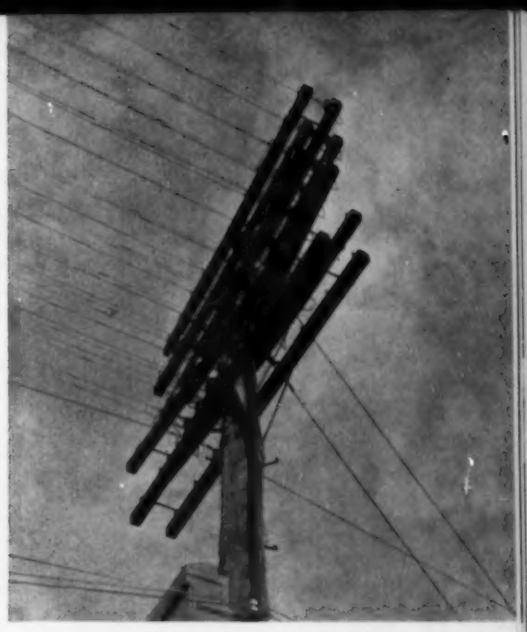
The Indiana Telephone Association convention held at Indianapolis on May 10 and 11 was a triumph for retiring president Frank E. Bohn, and secretary W. H. Beck. The program was well planned and the speakers well selected.

Among the speakers were: Dr. William Dern, Cincinnati; Frank E. Bohn, Ft. Wayne; G-man D. M. Ladd, Chicago; Louis Pitcher, Chicago; Ward E. Dildine, Ft. Wayne; W. H. Beck, Indianapolis; Foster L. Stanley, Indiana Bell; and H. W. Pike, Madison, Wis.

The Association elected R. V. Achatz, general manager of the Southern Indiana Telephone Company at Aurora, as its president for the coming year. He succeeds F. E. Bohn, president of the Home Telephone and Telegraph Company at Fort Wayne. Other officers chosen are W. H. Van Horn, Logansport, first vice-president; R. D. Pontius, Rochester, second vice-president; and W. H. Beck, Indianapolis, re-elected secretary-treasurer.

New directors selected are M. F. Hosea, Indianapolis, and Lamar Stoops, Napanee. The following directors were re-elected: John Harbaugh, Sullivan; V. W. Robinson, Winchester; W. H. Van Horn; and J. F. Carroll, Indianapolis.

Modern Methods of Wire Dead-ending



A dead-end pole on a toll line. The double crossarm is used and wire is dead-ended on the insulator nearest the camera.

By RAY BLAIN

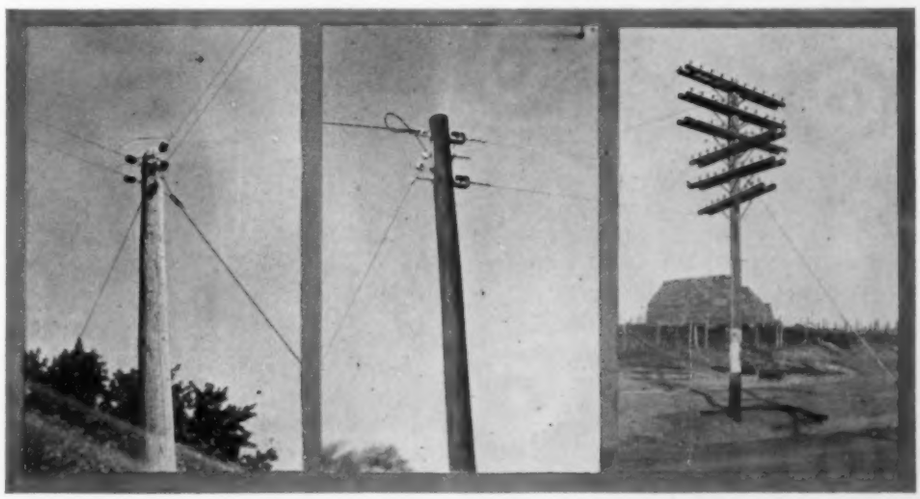
A RECENT check of all available literature on open wire construction indicates that little mention has ever been made with reference to the proper methods to use in dead-ending telephone line wires. Due to recent developments in materials, tools and construction methods, it is now believed that this subject is of sufficient general interest to permit its consideration here in detail. It is generally agreed that the proper dead-ending of line wire on any type of telephone line is a most important part of its construction which should never be slighted. In this article an attempt will be made to indicate why, and where, dead-ends should be used and how they can be best constructed.

There are various locations in the modern telephone line where dead-ending of the line wires proves a real advantage. Perhaps the most common of these is the dead-ending of open wire circuits at a cable terminal. This may be where a cable feeds a number of open wire lines or serves as an underground dip for them instead of passing over a railroad, power line or highway. These underground dips are now coming into general use and are ordinarily preferred to the aerial crossing which must necessarily make use of poles higher than the average.

THE buck-arm corner is still constructed frequently where space will not permit the use of the two-pole variety. Naturally on buck-arm poles the line wires must all be dead-ended in both directions. The buck-arm is also frequently used where a branch or spur line leaves the main open wire lead. When open wire is dead-ended on a buck-arm it is ordinarily jumpered by open wire at the cross-overs although some prefer, and continue to use, bridle wire in rings to connect the wires on one crossarm with that of the other.

Some telephone men seem to be of the opinion that a test point in a line where it may be conveniently and quickly opened for test to indicate the direction of trouble is a terrible sin ever to be avoided at all costs. This idea is no doubt a hangover from the old days when the then so-called test connectors caused noise and cutout trouble aplenty. Many have now come to share the opinion that test points at regular intervals in a line may be used to advantage by all companies who are not equipped with adequate testing instruments. Also that these test points will prove of real worth in the speedy clearing of difficult trouble.

There is every reason to believe that test points may now be constructed so as to provide every advantage without noise and cut-out trouble as experienced in the old days. Naturally, at any test point both wires of a metallic circuit must be permanently dead-ended in both directions. This may be effectively accomplished by various methods though perhaps the one most commonly used is the dead-ending of the wires on the pin by means of transposition insulators, one wire in each groove. The new one-piece transposition insulators seem to be ideal for this purpose. Another successful method of constructing a test point on a crossarm line is



(LEFT)

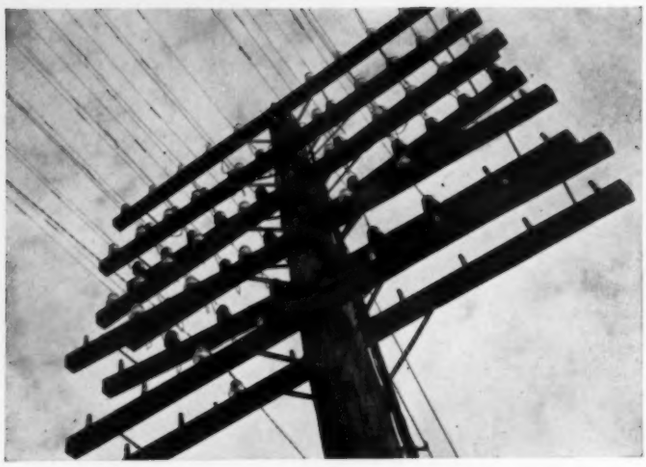
Strain insulator dead-end on a rural line corner, just another place where the compression type dead-end sleeve can be used to advantage.

(CENTER)

New type fixture and insulator used for a dead-end. Offset sleeves can be used here to advantage.

(RIGHT)

One type of buck-arm pole where the dead-end sleeves can be used to advantage.



A typical dead-end pole on a toll line. The wire is dead-ended on the back insulator and tied-in on the front.

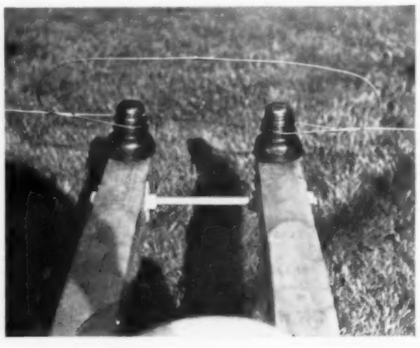
by the use of break-irons, equipped with steel pins. This arrangement consists of a short length of heavy iron with a steel pin in either end which is attached to the pin hole in the crossarm by a bolt and large cupped washer.s When this method is used the line wires are dead-ended on separate insulators located about 6-inches apart.

SOME few prefer to connect a small strain insulator in each line wire near the crossarm. The line wires are dead-ended in both directions on the strain insulator and it is claimed that this method makes the pulling of slack much easier as seldom will the insulator move any considerable distance from the crossarm on any ordinary slack pulling job.

Regardless of the type of test point used, if properly constructed they all effectively serve the same purpose, that of providing a convenient test point in a line. The line wire should always extend beyond the dead-end in each direction and connect by some convenient means so as to make the circuit continuous. The modern solderless connector does this job very well and no case is known where they cause trouble when properly installed. For those who desire to make use of test points who do not trust a solderless connector to connect the two ends of the wire, it is suggested that the free ends of the two dead-ends be connected by means of a compression type sleeve. These sleeves require a very small amount of wire and sufficient slack may be left to provide a number of openings before the ends grow short.

If it is particularly desirable to save wire at a test point, the compression sleeves can be nicked with pliers to prevent the wires from entering the sleeve for the full distance. On most cases of trouble only one side of the circuit need be opened and this may be alternated. Ordinarily a good line does not require opening at a certain test point at frequent intervals but such an arrangement does often prove a great convenience on special occasions when attempting to locate a difficult case of trouble. While slack blocks may of course be used to open a line this method does not prove near as convenient as the test point described above.

Dead-ends are ordinarily made on crossarms or wood brackets though now they are frequently made on strain insulators. When the strain is not excessive a single crossarm with a brace-back is generally used for the dead-end. On heavy loads double crossarms should be used. Formerly the wire was looped around the two insulators on a double arm so as to form a figure 8 and the connection made outside the crossarm. In late years this method has been practically abandoned and the wire is now dead-ended on the back insulator and merely tied in place on the other. The jumper wires are then connected to the line wire or the free end of the dead-end between the crossarms and convenient to the bridle rings.



Offset dead ends and sleeve used at a test point.

Offset dead-end and reducing sleeve for bridle wire connection.

WIRE is dead-ended on wood brackets in practically the same manner as that used for crossarms. A single bracket carries small loads but double brackets should be used on heavy strains. Brackets are often wired to poles or reinforced by cleats which fit over them in the form of square pipe straps. When double brackets are used the wire is dead-ended on the back insulator and tied to the other. Brackets should be separated on the pole to make this arrangement possible.

Many now prefer to make use of strain insulators for terminating bracket circuits. There is no doubt but that this method provides a neat and serviceable job. Some make use of eye-bolts which have strain insulators attached to them by a special clevice. Others merely attach the strain insulators to the poles with about two wraps of No. 12 galvanized wire. Either method is considered satisfactory, the eye-bolts better perhaps though the wire is considerably cheaper.

There is also available a heavy steel bracket and line insulator assembly which may be used for dead-ending telephone lines. These brackets are attached to the poles with a through bolt and held in place to prevent turning by a lag screw. While these brackets cost more than the other described methods there is no doubt but that they provide a very good dead-ending arrangement and are considered especially suited for use with the new high-tensile strength wire.

In the old days when iron wire was used almost exclusively dead-ends were made by merely passing the line wire around the insulator and clamping the free end to it with a pair of splicing clamps and serving. Ordinarily such a dead-end should have about one and a half wide spaced turns, and at least five close wraps. Care was necessary to avoid burning the wire where it was held in the splicing clamps. The free end was ordinarily left long enough for attaching the jumper wire. Regardless of the type of dead-ending method used, the neck, that is the distance from the insulator to the point where the two wires converge, should be from 2½ to 3½ inches long, depending on the type and size of insulator used. It is desirable to have this distance longer than actually required for when it is

(Continued on page 33)

Short Course in Telephone Transmission

By
B. C. BURDEN

PART V

Wave Propagation

General

IN studying the theory of a telephone line as a transmission medium we find that a somewhat different electrical action takes place than is the case with a piece of electrical apparatus. Due to the fact that a telephone line has length and because electrical speech waves require a finite time to travel from one point to another, we must consider what is termed **wave propagation.**

We are used to thinking of electricity as travelling at the rate of 186,000 miles per second, hence in electrical apparatus, as for example a telephone receiver, we assume that electricity travels through the few hundred feet of wire on the receiver coils with such speed as to be virtually the same magnitude and phase throughout the entire length of the receiver coil at any instant.

But in a long telephone line we have a much different phenomena. In the telephone line the current which we impress on the input end of the line grows progressively smaller as it travels down the line and the current which we take from the output end of the line will be much smaller than our original input current. The telephone line acts like a parallel circuit rather than a series circuit due to the shunting effect of line leakage and capacity.

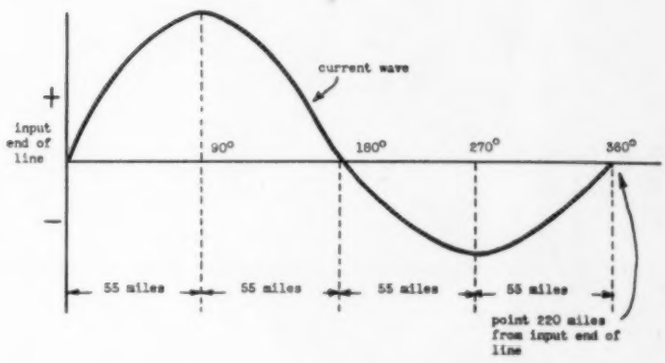


Figure 2 — Phase shift along Telephone line.

The Attenuation Effect

In speaking of the effect of line current becoming progressively weaker as it travels over a telephone line, we say that the "current is attenuated." The attenuation of the current as it travels along the line is due mainly to three factors: the capacity between the wires C, the series resistance of the line R, and the leakage between the wires G. Figure 1 aptly illustrates how the current is attenuated as it travels along the line. In this Figure the telephone line is pictured as consisting of a number of condensers, (representing the capacity of the line) shunted across the line at various intervals. As the current travels down the line, it is attenuated slightly at each condenser, due to the shunting effect of the capacity.

In the same manner line leakage plays its part in attenuating the current as it travels down the line. Line leakage consists of the leakage path across insulators, cross arms, tree branches, etc., and can be visualized as a high resistance shunted across the line as shown. It will be noted in Figure 1 that the line current is attenuated slightly each time it passes one of the shunt resistances.

The foregoing discussion and the illustration, while it depicts the means by which attenuation takes place, does not present a true picture, because the capacity of the line and the leakage are not lumped as shown, but are uniformly distributed along the line. As a result, the attenuation of the current progresses smoothly along the line, and not in steps as shown in the Figure.

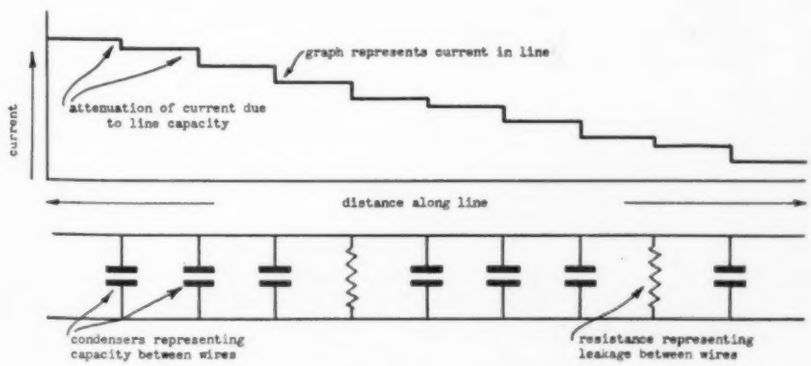

graph represents current in line
current
attenuation of current due to line capacity
distance along line
condensers representing capacity between wires
resistance representing leakage between wires

Figure 1—Attenuation effect in Telephone line.

Phase Shift in Long Line

In addition to current undergoing a change in magnitude as it passes over a telephone line it also undergoes a **shift in phase.** For example, at the input end of a long toll line the current at a given instant may have just reached

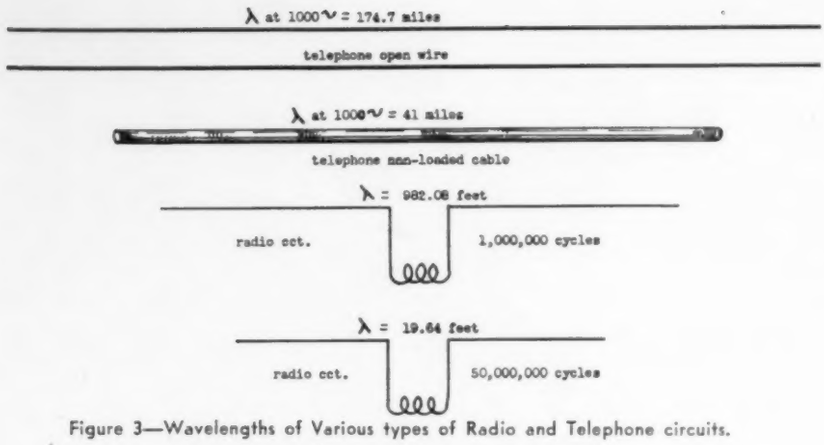


Figure 3—Wavelengths of Various types of Radio and Telephone circuits.

its maximum value (90° point in cycle), but at the output end the current may be zero at this same instant (180° point in cycle), at points intermediate between the start and end of the line the current will have various phase values ranging from 360° to zero.

This condition results from the fact that it akes electricity a finite time to travel over a transmission line and while the electrical wave travels along the telephone conductors the phase at the input end is changing. As was stated previously, we ordinarily think of electricity as traveling at the rate of 186,000 miles per second, but we find this is not the case in transmission lines, due to the capacitance, resistance and inductance of the line. While it may be difficult to visualize how capacity and resistance and inductance can affect the speed with which electricity travels over wires, the phenomena can be explained by the fundamental laws of electricity.

Reason for Phase Shift Effect

It is a well known fact that it requires a certain amount of time to discharge a condenser through a resistance; and the larger the condenser or resistance, the greater the time required to complete the discharge. It is an equally well known fact that an inductance tends to prevent any change of current flowing through it. Now let us apply these facts to a transmission line and note their effect on the current.

When an input signal is impressed on the sending end of the line, this signal charges up the capacity of the line. Now as the input signal reverses on the next half cycle, the charge remaining in the capacity of the line must discharge through the resistance of the line, and since this cannot take place instantly, time is required for the passage of the current along the line. Thus the electricity has a **fixed velocity** the magnitude of which is dependent on the type of circuit.

Speech waves travel at greatest speed over open wires and slowest over cables. If load coils are used this slows the speech waves still more. Table 1 gives the approximate velocities for several different types of transmission lines.

Table No. 1

Velocity of Wave Propagation for Open Wire & Cable

Type of Circuit	Velocity in miles per second
No. 104 Copper open wire	174,722
No. 19 ga. non-loaded cable	41,000
No. 19 ga. Heavy loaded cable	8,525

Propagation Equations

The amount of phase shift (for any frequency) per unit length of line depends on the resistance, inductance, and capacity of the line. For those interested in the more involved mathematics of transmission line theory, an explanation of the equations which enable phase shift to be computed may be worthwhile.

The amount of phase shift (also attenuation) is expressed in what is termed the **propagation constant.** The propagation constant contains both the effect of attenuation and phase shift.

Mathematically it is equal to:

$$\gamma = \sqrt{(R+J\omega L)\ (G+J\omega C)}$$

It can be expressed in simplified rectangular form as:

$$\gamma = \alpha + jB$$

(Please turn to page 35)

Kellogg Switchboard & Supply Company Elects New President and Secretary

JAMES G. KELLOGG

JAMES H. KELLOGG

The Board of Directors of the Kellogg Switchboard & Supply Company, Chicago, at a meeting on May 25th, elected Mr. James G. Kellogg, president and Mr. James H. Kellogg, secretary. With these newly elected officers, the company has identified with it, the second and third generations of the Kellogg family. The new president is a son of Milo G. Kellogg, founder of the firm, and has served as Vice President and Secretary until his recent appointment to the executive position. Mr. J. H. Kellogg, a son of the president and grandson of the founder, had formerly held the position of assistant secretary of the company.

"Open House" AT JOHNSTOWN

This beautiful air-conditioned, completely modern edifice is the new home of the Pennsylvania Telephone Corporation's Johnstown, Pa., central office.

Before an assemblage of over 125 invited big-wigs of the telephone industry, the Pennsylvania Telephone Corporation formally dedicated its beautiful all new central office building and exchange at Johnstown, Pennsylvania on the morning of May 22. The formal Cutover Party took place exactly 30 days after the actual cutover on April 22. The exchange has the distinction of being the world's largest all-relay equipped central office.

Some idea of the outside and inside beauty of the exchange is given in accompanying photographs. A technical discussion of the equipment is now being prepared for a coming issue of TELEPHONE ENGINEER. The ultra-modern building embodies all latest developments including glass brick paneling for windows, complete air-conditioning equipment and all new switching equipment engineered and built by the North Electric Manufacturing Company of Galion, Ohio.

The invited guests were greeted at the door of the new building by H. M. Engh, vice president and general manager of the Pennsylvania Telephone Corporation. Small groups were guided through the entire building from basement, through to the third floor which houses the emergency power and air-conditioning equipment. The first floor includes a beautiful lobby; commercial quarters; a service observing switchboard of latest type; offices for the plant department, and cable vault.

In the basement is a fully equipped garage, which will accommodate all the company cars and trucks, and a complete storeroom for outside plant materials, as well as station and P.B.X. equipment. The storeroom is platform-high above the garage floor so that installation and construction trucks can be backed up to the platform and loaded efficiently.

On the second floor the visitors saw the "world's largest all-relay equipment" furnished by North Electric; toll switchboards; the test center; power plant, and commodious operator's quarters.

A reception and luncheon at the Fort Stanwix Hotel was the culminating feature of the day. Immediately following the reception, luncheon was served with officials of the Pennsylvania Telephone Corporation seated at a special table. Serving as toastmaster, Charles H. English, Erie, attorney for the corporation, introduced a number of those present, after outlining the history of the Johnstown exchange which consolidated the local Bell exchange in 1938.

Among those introduced who responded with brief talks were: John Winn, president of the General Telephone Corporation, New York; F. L. Connor, president of the Johnstown city council; F. S. Chesterman, vice president of the Bell Telephone Co. of Pennsylvania; W. H. Meyers, of Meyers & Johnson, building architects, Johnstown; John F. Wilson, Wilson Construction Co.; H. M. Engh, Erie, who served as host, and F. R. McBerty, president of the North Electric Mfg. Co., Galion, Ohio.

Several of those in attendance traveled across the continent to attend the Cutover Party. Everyone voiced their praise of the hospitality extended and enjoyed.

LEFT

HARRY M. ENGH, vice president and general manager of the Pennsylvania Telephone Corporation, personally greeted each invited guest at the Johnstown "Open House."

RIGHT

A view of the distributing frames containing North Electric switching equipment. This nerve center was in operation 30 days before the formal "Open House."

Cameraman Ray Blain was busy at the Pennsylvania convention. (Upper left) Erling Ringstad; C. C. Sowards; Margaret Otstot; M. Ethel Cunningham. (Upper Right) H. M. Stewart; John H. Wright. (Lower left) "Demonstration in First Aid" Paul Brandsby, Captain, not shown in picture. (Extreme left is Robert Donley of the Columbia Telephone Co. who died Friday evening after he left the banquet.). (Lower right) T. B. Dally; S. E. Wright and friend.

Pennsylvania and New York Convention Reports

The state conventions continue in full sway. Cooperation between the state Associations and the manufacturers and suppliers was never more evident than at the present time. By scheduling their meetings in rotation state associations have had more and better exhibits for their members and combined with other factors have had larger and better attendance. Since our last issue the state associations of Pennsylvania and New York have held their annual conclaves. The Wage-Hour situation is still the paramount subject in discussions.

Pennsylvania's Annual Meeting

The 19th annual convention of the Pennsylvania Independent Telephone Association established a new 8-year record for attendance, enthusiasm, and optimism. The program was officially opened by President John H. Wright, who welcomed a large and representative delegation.

With the aid of lantern slides, Mr. Harold C. White, General Auditor of the Meadville Telephone Company, of Meadville, Pennsylvania, and associated companies, graphically illustrated a lecture on Simplified Forms and Methods of Plant Accounting for Smaller Companies. A demonstration in First Aid was given by employees of the Columbia Telephone Company. The team, consisting of Paul Bransby, Captain, Clark Berrier, George Datesman, Harry Dennison, Robert Donley, Thomas McCarty, and William Worley, was loudly applauded for its very efficient, snappy, and interesting demonstration. This is the first team of Pennsylvania telephone employees to become an American Red Cross First Aid Mobile Unit. The entire Convention was later shocked and saddened by the sudden death of Robert Donley, one of the outstanding members of this team. Mr. Donley died Friday evening of coronary occlusion.

Mr. Wright, President of the Association ,opened the Friday Program with his Annual Report and address. He was followed by Louis Pitcher, executive vice president of the United States Independent Telephone Association. Mr. Pitcher gave considerable attention to progress of certain legislation now before the National Congress and Regulatory Bodies.

Another feature of the Friday Program was a stimulating talk on Sales Promotion Work, by Mr. F. J. Chesterman, Vice President of the Bell Telephone Company of Pennsylvania.

Mr. Chesterman closed his subject with a delightful surprise in the form of a short two act play or skit, in which the technique of selling additional telephone service was subtly woven. Well written, masterfully produced, and artfully handled, this feature was a fitting climax to a good program, and left the audience feeling well compensated for its investment in attending the Convention.

The Pennsylvania Association was extremely fortunate in obtaining the services of Mrs. Mayme Workman, Traffic Supervisor of the Illinois Telephone Association, to conduct its Traffic School. A feature of this school was a "Toll Ticket Pictorial," presented by Miss Mary Rittase, Toll Chief Operator of the Bell Telephone Company of Pennsylvania.

The Accounting Conference of Friday afternoon, under the direction of the standing Committee on Accounting, was presided over by Vice-Chairman W. W. Shoop. Proposed Uniform System of Accounts for Class C and D Companies, and Continuing Plant and Property Records, were the high points of discussion. The Conference was well attended by both accountants and representatives from other departments of telephone operating.

Recent and pending rulings of the Pennsylvania Public Utility Commission were given primary consideration of the Commercial Conference, under the direction of the standing Committee on Commercial Practices, headed by H. J. Huether, of Erie.

The Plant and Engineering Conference, under the direction of the standing Committee headed by acting Chairman G. E. Twigg, General Plant Manager of the United Telephone Company of Pennsylvania, drew a record-breaking crowd. Such subjects as new high tensile iron wire, strand mounted cable terminals, new approved methods of cable maintenance, and inductive disturbance to telephone service, afforded material for lively and illuminating discussion.

"The "speechless" Banquet, Friday evening, drew an extra large crowd that took full advantage of this brief respite from the cares and troubles of their daily routine and the more serious features of the Convention Program. The Banquet was followed with a well-balanced and fast-moving floor show. The traditional Dance wound up the social function.

The tragic and untimely death of Robert Donley, Wire Chief of the Columbia Telephone Company at midnight Friday cast a cloud of sadness over the delegation. However, after due deliberation, the Officers decided to continue the Program as originally planned, and a sizeable number entered into a discussion of those subjects allotted to the Saturday morning Conference. The Convention was adjourned with the firm conviction that, aside from the unfortunate incident of Friday evening, it was the best recorded by this Association for several years.

All available space for manufacturers' exhibits was reserved well in advance and the displays were well in keeping with the progressive spirit of those who have assumed responsibility of supplying the Independent telephone industry with the latest advancements.

The cooperative disposition of manufacturing representatives contributed much to such success as this Convention may have attained.

New York Convention

The 1939 Convention of the New York State Telephone Association was held at the Hotel Syracuse, New York, May 23-26. The 23rd was the golf day enjoyed by all including the rain gods. Everybody took a good wetting. After the game they gathered at the buffet supper and enjoyed good food and the prizes. Fred Fuller of the New York Telephone Company was declared the Open Golf Champion for 1939 and was properly decorated.

On the morning of the 24th the Convention exhibits and program opened. From the exhibitors' standpoint this convention was outstanding for they did some real business. We understand several switchboards were sold. One exhibitor said that when sales are made at a convention it is a real convention. The convention floor of the hotel was arranged to suit telephone needs and everybody was pleased.

The program itself was an education. It was well balanced and the speakers exceptionally good. Arch MacKinnon started things off with his annual report. From then on no one could afford to miss a single session. "Both Sides of the Tax Fence" by Charles C. Chappell of Middletown was very interesting. Mr. Chappell was Mayor of Middletown and had an opportunity to see both sides. This was followed by "Sound Fundamentals for every Business" by Dr. Harry W. Hepner of Syracuse University. Frank McKinney, Secretary of the Ohio Association gave a very inspiring talk on "Our Sound Thinking Responsibility" in which he brought out that we are all in politics by government being in business and if we desire to get out of politics we must get government out of business. Major Bowlin gave an understanding as to what preparation is going on in business to handle war materials. From the questions asked everyone was very much interested. Louis Pitcher substituted for B. L. Fisher and gave a very fine talk. One interesting feature was the viewpoints of Francis X. Welch and Dean William E. Mosher as to what was wrong with government and how to cure it.

Malcolm F. Orton of the Public Service Commission made the dry subject of accounting very interesting. W. A. Kietzman, newly elected Vice-President and General Manager of the Up-State Area of the New York Telephone Company followed the picture of the hurricane with a fine talk on what they had learned from the hurricane and the methods they are now using. The talks of Cyrus W. Kurtz and C. E. Hess were also very interesting. A Skit was enjoyed by everyone. The banquet was also a great success. The old Officers and Directors were reelected with the change of Lloyd C. Wright instead of H. H. Griswold as Vice-President.

INTRODUCES NEW PITCH CONTROL DEVICE

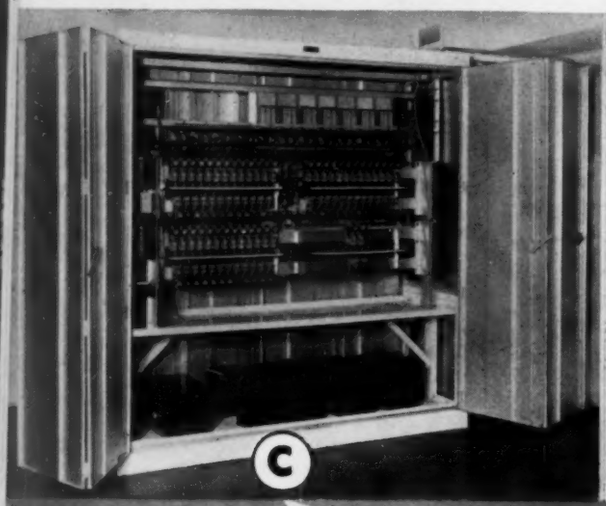
A novel instrument for the investigation of speech was introduced to members of the Acoustical Society of America at their convention in New York on May 16. By means of an electric circuit, developed by Homer Dudley and his associates in Bell Telephone Laboratories, a speaker's voice could be raised or lowered in pitch; be given a falling inflection for a rising one; or be made to carry on a dialogue with it. The circuit, which has not yet been named, is like the Voder, now on demonstration at the World's Fair, but here the control is by a speaker's voice instead of by keys.

Usefulness of the instrument in speech studies lies in its ability to vary, singly or together, each of the elements of speech. The raw material of speech is two streams of sound. The proper variations of these two streams give us intelligible speech. The first sound stream is characterized by three properties; it has a pitch which is determined by the fundamental frequency of vibration; it has an intensity which is determined by the total sound power issuing from the mouth of the speaker; and it has a quality which is determined by the relative amounts of sound power carried in fixed frequency bands. All three of these properties of the stream vary as the stream proceeds. The second sound stream is characterized by having no pitch; it is a noise and has an intensity and quality which vary as

(Please turn to page 32)

Demonstrating the new instrument introduced in New York, May 16, by the Bell Telephone Laboratories. The controls, allow the raising or lowering of the speakers voice in pitch.

★ Large P-A-B-X, furnished with either floor or turret type attendant's cabinet



★ Strowger Automatic equipment for exchanges of every size and to meet every condition

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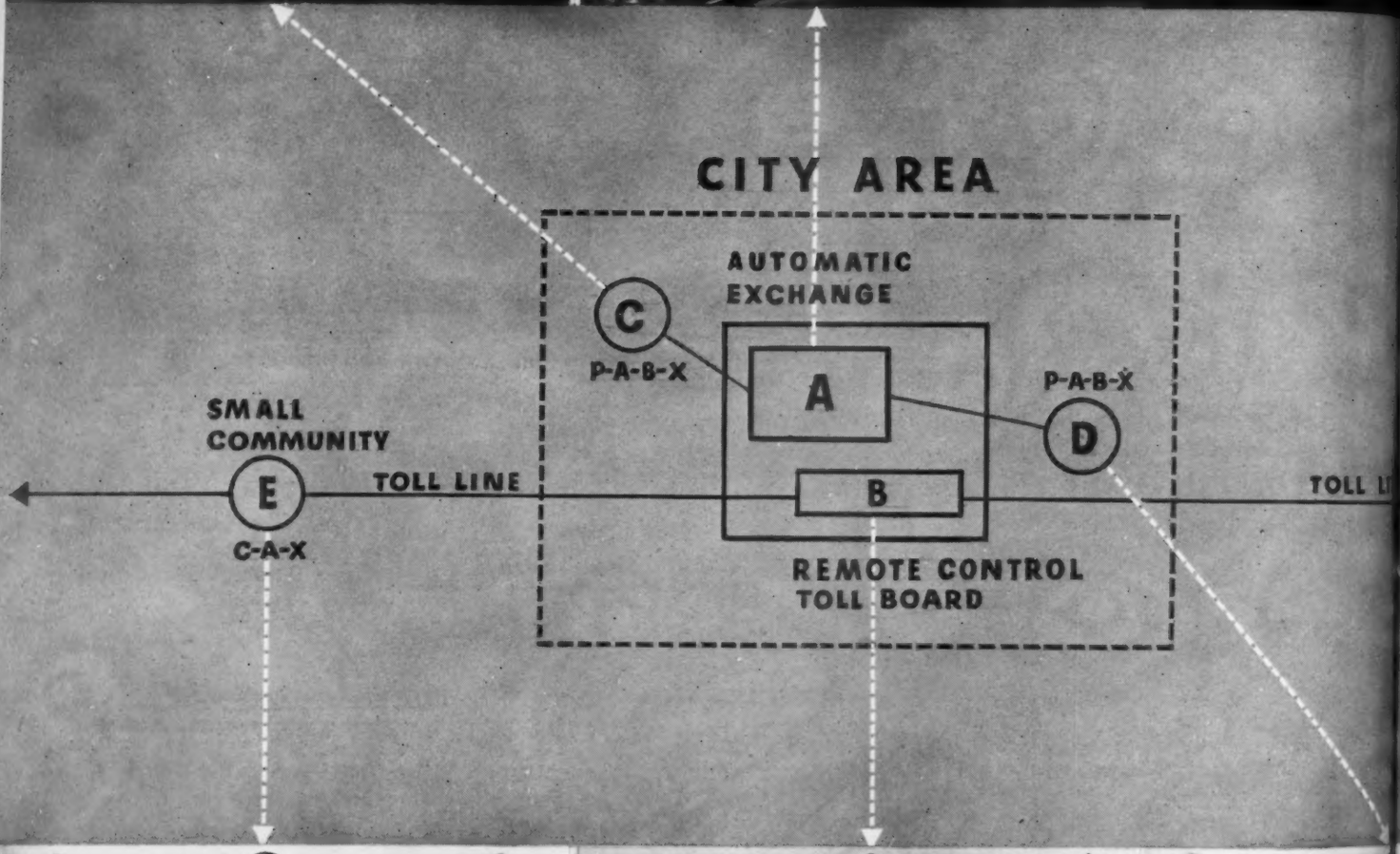
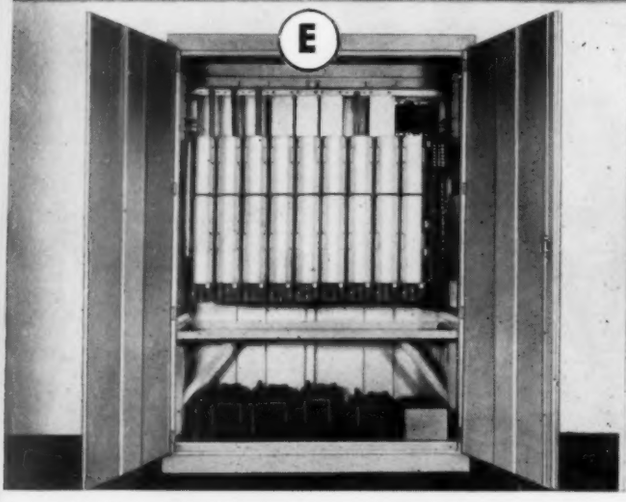
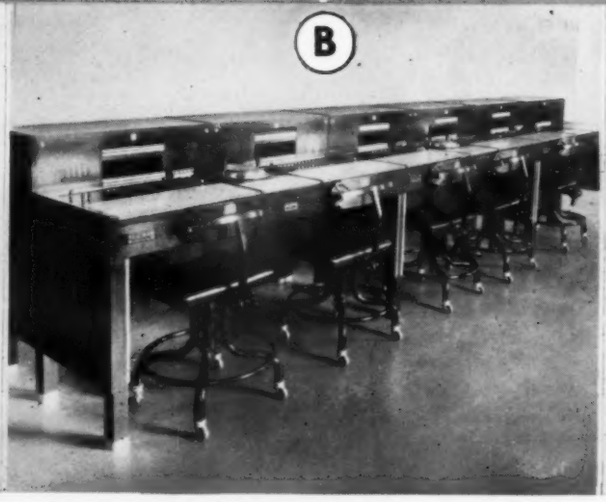
TEL

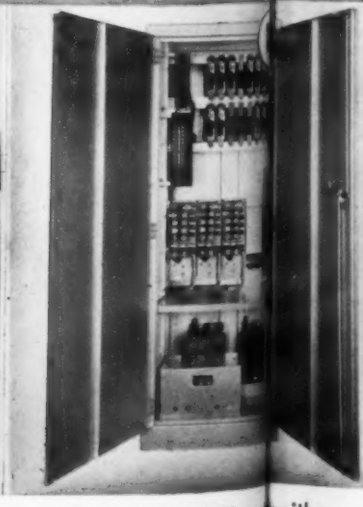




★ Strowger Automatic equipment for small unattended exchanges



★ Remote Control Toll Board—incorporates all the latest features of modern toll operation



★ Small P-A-B-X, sup either an attended or sis

...very variety of ...ELEPHONE SWITCHING

Strowger Automatic Equipment is *Better — Faster — Cheaper*

★ To experience complete satisfaction in every phase of modern telephone operation — to provide better service, faster connections, and to do it more economically—telephone companies are turning more and more to Strowger Automatic equipment.

This time-tried and proved automatic equipment—accepted as standard by telephone engineers throughout the world—can be provided to serve every switching requirement. Large city exchanges, metropolitan multi-office areas, suburbs, small rural communities, private branch exchanges of every size, attended or unattended, long distance lines and toll areas—whatever the requirement for switching lines or circuits, it can be done automatically —and consequently better, faster and cheaper!

Illustrated here are Strowger Automatic switchboards to fit the specific situations indicated. These are typical of the wide range of this apparatus, which includes types designed to serve grounded or metallic lines, magneto or central battery telephones, with straight line, harmonic or automatic code ringing, and furnished either in unit type all-metal cabinets (for the smaller sizes) or with frames of various heights to meet every variation in ceiling and floor plan.

Let us tell you more about Strowger Automatic equipment as it applies to your particular situation—and mainly, how it can make your operations more stable and more profitable. Consult our representative, or, if you prefer, write to us direct.

AUTOMATIC ELECTRIC

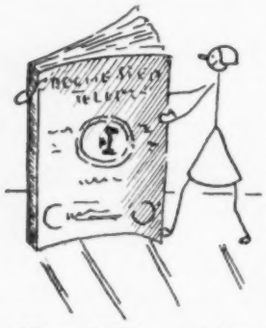
MAKERS OF TELEPHONE, SIGNALING AND COMMUNICATION APPARATUS
ELECTRICAL ENGINEERS, DESIGNERS AND CONSULTANTS

Distributors in U. S. and Possessions:
AMERICAN AUTOMATIC ELECTRIC SALES COMPANY, 1033 W. Van Buren St., Chicago, U. S. A.
Export Distributors: AUTOMATIC ELECTRIC SALES COMPANY, LIMITED

Telephone Directory Provides Novel Hobby

By
MAYBELLE CASE PARFITT
Rochester (N. Y.) Telephone Company

When I received my copy of the Rochester Telephone Corporation directory, my first impulse was to look up my own name. As I turned the pages my eye fell on the surname HOBBY. Hobby?—well, why not start one myself, combining names in order to meet the well known people in the book and also interweave these names in my STORY.



So I strolled through the directory, looking for the GOOD, the WISE, and everyone else. The first PERSONS I met were Adam and EVE and their children CAIN and ABEL. THEN the FLOOD and NOAH'S ARK came AFTER. A BELLE of the GAY nineties, SWEET-PEGGY-O'NEILL, and also ROSIE-O'GRADY were introduced by PETER-PIPER to HANS-ANDERSON, that WEAVER of fairy stories, so delightfully written for a DEAR-LITTLE-MAID and a LADD. There were two BATCHELORS and eighteen BENEDICTS. THEN to my consternation a HUSSEY appeared, but VIRTUE was QUICK to ENTER.

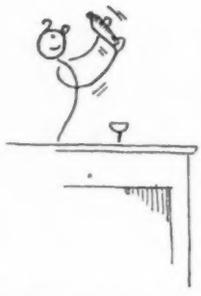
As I continued my quest I soon met LUCY, NELL, KATE and MARY. Also NORMAN, ROY, JAMES, JOHN, and ROBERT, JACK and THOMAS and BARNEY; in fact every FRIEND was listed.

Amongst the entertainers I found DOCK-STADER and BARNUM and BAILEY. And in another F I E L D, CHARLIE-CHAPLAIN. AMOS and ANDY, the BLACK-faced comedians, WALTER WINCHELL, the dispenser of gossip, EDGAR-GUEST, HEARTY-MAJOR-BOWES and many others were all waiting to go "on the air" for your enjoyment wherever you live, GLEN or DALE, FOREST or FIELD, LANE, PIKE, STREET; even if you SLEEP in the PARK or on a CLIFF.

LAW and JUSTICE were represented by WILLIAM(S)-JENNINGS-BRYAN and CHARLES-DARROW. I found the father of our country, GEORGE WASHINGTON and THOMAS-JEFFERSON, the SAGE of Monticello. ALEXANDER-GRAHAM-BELL, the inventor of the telephone was there. And right here we must mention some of the equipment he used, CABLE and LINES.

Of world fame was WALLEY-WARFIELD and the D U K E of W I N D S O R. JACK-DEMPSEY was talking of the man who took the c h a n c e, STEVE-BRODIE.

APRIL (E), MAY and AUGUST are FINE months for a vacation and we find them in the directory. There are plenty of places from which to choose, whether your TRAIN or PLANE goes EAST, WEST, or NORTH, to WASHINGTON, BALTIMORE, CLEVELAND, DEARBORN, BRUNSWISK, WOLCOTT, KENDALL, LE ROY, MORTON, CRAWFORD; to MOUNTAINS or to RIVERS. Even a LITTLE-CRAFT with a SMALL-CREW will enable one to FISH and land some BASS, but don't forget, before the FRY there are FISH-SCALES.



The BREWER, BARMASTER and COOPER must always be busy as the BARRs and the COUNTERs seem well STOCKED with BEVERIDGES such as KIMMEL, S H E R R Y, STOUT, BOURBON, BEERS and CHAMPAGNE, but if you indulge remember the COPP and the SERGEANT. A DUTCH-TREAT is always nice, to say nothing of a KICK and a BENDER. If this does not appeal, you might try a fruit diet. You can find BERRY, CHERRY, APPLE, LEMON though BITTER, PEAR, PLUM, and GRAPE to tempt you.

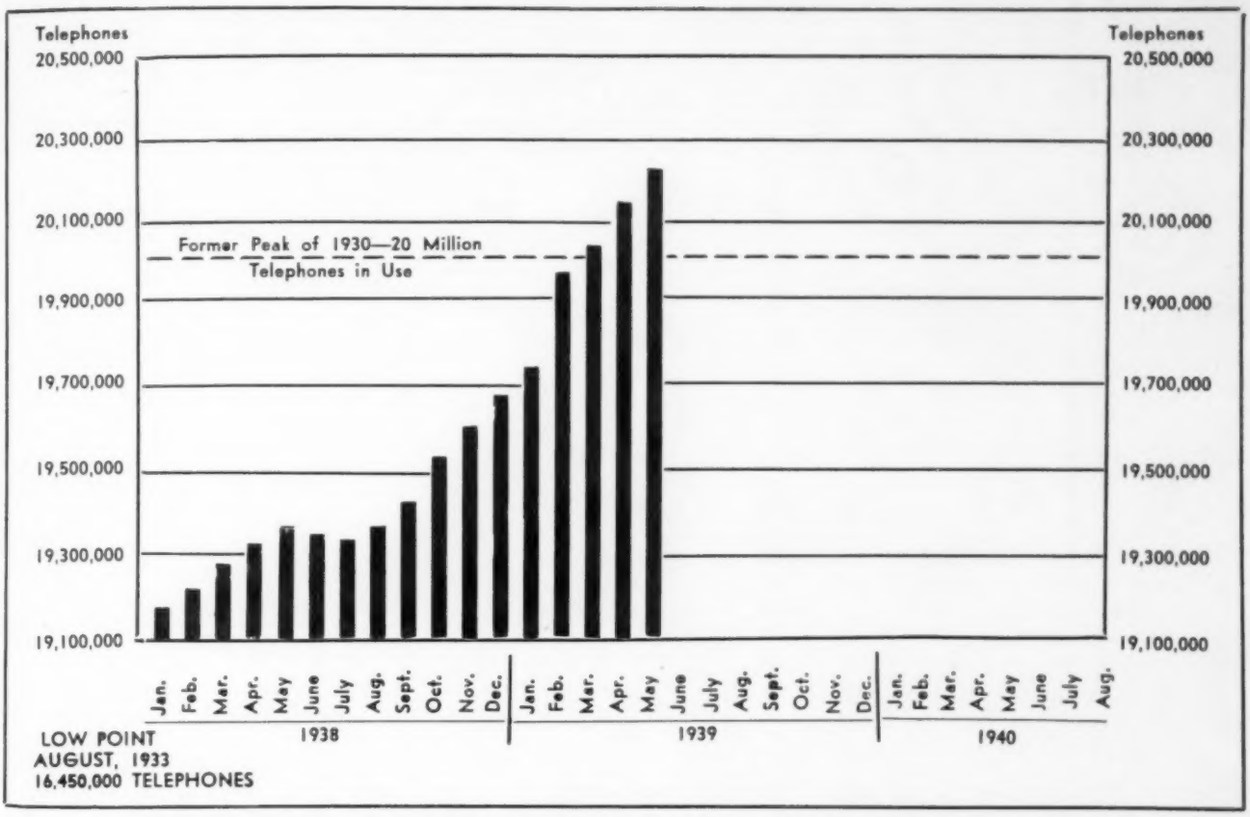
The beautiful trees claimed my attention, the CHESTNUT, ASH, BIRCH, ROWNTREE and ALLNUT. Also the zoo, where I found the MOLE, WOLF, FOX, LAMB, MINK, ROACH, BEAVER, BULL, and LARK; even a FLY and a BIRD.

If you think our book not colorful, check these names. BLACK and W H I T E, ROSE and GREEN, PURPLE, GRAY, PINK and BLUE, and even SILVER and GOLD. The Colonel's LADY or Judy O'GRADY could easily select their ensembles—and their flowers too, for we have the POPPY and the ROSE.

The RACE is well represented—IRISH, ENGLISH, GERMAN, DUTCH, and FRENCH. And one can find precious STONES such as the AGATE, RUBY, PEARL and DIAMOND.

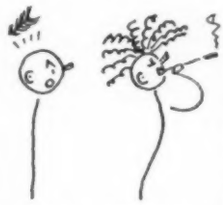
Here are some amusing combinations—

Monthly Telephone Station Barometer



By popular demand we again present as a monthly feature the Telephone Station Barometer. It is interesting to note that the former high records of telephones in use in the United States was passed during March of 1939. Too, it is predicted there will be no summer loss of telephones for 1939.

There is a SHORT-HOSE and a LONG-STOCKING, both HARDY and STRONG and suitable for YOUNG and OLD, but you cannot find a sock.



You can find CURLEY and STRAIGHT-WIGGS if you are not satisfied with HAIR-DYE.

If I should desire to PURCHASE a HOUSE, and have STOCK or a BOND, I'd first inquire the PRICE. If satisfactory, get CASH from my BANKER, obtain the LOCK (E) and KEYES and put up a sign "SOLD." I could PLANT a ROSE-BUSH and a VINE. Buy WOOD and make a DAVENPORT or COUCH and have COMFORT. Now I am ready for my FRIENDS to CALL. I sort the CARDS, where I find DIAMOND, CLUB, SPADE and a HART, and start the game. Or I can invite the COUSINS sometime when it is FAIR and COOL. and at the DAWN of DAY we can have an APPLE-PEELING party instead of a husking bee.

As I sauntered down LOVErs LANE, a SWAIN was finding LOVE names for his SWEET-ANGEL-CHILD. The DEAR-DARLING was filled with BLISS and LOVE at being called "ADORABLE-DOLL."

DOBBIN, drawing an old BUGGY with a RIDER alternately GALLUPing and then calling "GEE," raced through the LANE, PIKE, and STREET stopping at the HOUSE for the nurse and the DOCTOR. The LONG and SHORT of the STORY is that the CHILD was one of many FINE-FELLOWS and the BISHOP gave the BLESSING of the CHURCH.

I found it much better to be MANLY and GALLANT than MOODY, CROSS, or show ANGER and be called a CRABB. But to be GIDDY and GABBEY was unwise.

Some queer names I found were: Sass, Scamp, Six, Sobb, Meo, de la Tore, Bos, Ets, De Die, Oca, Schoonover, Dr. T. B., Vyverberg, Yivisaker, Daddy, Papa, and Garlick, Another odd one is Oddo. The shortest name is Ey, and one of the longest is Schneckenburger.

And last, but not least, we have Smiths, Schmids, Schmidts, Schmitts, Schmitz', Smyths and Smythes.

Now that we have traveled through the PAGEs together, I will CLOSE the book and bid you GOOD-(K)NIGHT with FAITH, HOPE and CHARITY.

MAYBELLE CASE PARFITT.

$280 Is Japanese Transfer Charge

The Ministry of Communications has fixed the price of 1000 yen ($280) as standard for telephones transferred in the Tokyo area. This has been done at the request of telephone brokers and is in line with the governmental supervision announced recently.

LINE and DESK

RAY BLAIN, Editor

Q. We have some very old rosin core solder which we have only recently learned causes corrosion when used to solder connections in small copper wire. Is there anything we can do to eliminated this trouble and avoid its re-occurance in the future?

A. There is no doubt but that the flux in the solder contains impurities and if you have any left we suggest that you drop it gently on the junk heap. You can avoid such trouble in the future by purchasing the best solder from a good company, who manufacture solder for telephone use. Your telephone supply house will be glad to recommend a safe type.

Q. We are in need of a manhole heater to be used to make manholes comfortable for a cable splicer to work in during extremely cold winter weather. What do you recommend for this purpose?

A. We would recommend the portable gasoline operated electric heater. This outfit has a generator direct connected to the engine, the current from it operates the heater and a fan forces air through it into the manhole. The engine is also jacketed so that its natural heat may also be utilized to help the electric heater. This is the most satisfactory and at the same time the safest heater we know of which is entirely satisfactory for ordinary use.

Q. Will it be possible for us to obtain a line construction truck with a carrier for the ladders and pike poles mounted on top, rather than the side of the truck body? We feel this would provide a neater and more convenient method and the customary method of mounting.

A. This arrangement has been used to some extent and we are of the opinion that almost any line body manufacturer can provide this arrangement if you request it. However, we are of the opinion that it would not prove desirable in most cases. In the first place the average present day line construction truck is so high that the top mounting would be most difficult to reach. Also it would be very much in the way when a pole derrick is being used.

Q. Is there any equipment available which may be used as a core for conduit, to be moulded in place from concrete and the core later removed after the concrete hardens?

A. Such equipment was on the market a few years ago although we do not believe it ever proved a great success. It consisted of a flexible core which was essentially a rubber hose which was inflated with water or air. It was then covered with concrete and after drying the core was deflated and removed. It does seem that such an arrangement could be successfully used for making short turns in single lateral conduit runs instead of pipe bends. It appears that perhaps some type of fibre conduit would prove best for this type construction. This conduit to be covered with concrete and then left in place.

Q. We are in need of some type of duct rodding outfit which can be pushed into a small conduit with the cable still in place. Can you recommend any tool which can be used for this purpose?

A. We would suggest the use of the new steel rod or wire type of rodding outfit. This is made of special oil tempered spring steel wire in almost any length desired. The wire is coiled on special large reels and is most convenient to use. For ordinary use one length of 300′ and another of 400′ will meet all telephone requirements. For use in a new section of conduct one end is equipped with a pick-up or female fitting. The other end carries a leader or male fitting. With this arrangement the steel wire may be pushed into a conduit section from both ends and joined in the center, then pulled out from either end. This method is both an easy and rapid method of duct rodding.

Q. What method would you recommend for attaching split knobs to a hollow tile wall?

A. We have made use of toggle bolts for this purpose with complete success. The 3/16″x4″ size will ordinary prove satisfactory for this purpose.

Q. Can you tell us the number of feet of 22 ga. cable to the ohm at 60 degrees F.?

A. One table gives 62.75 feet making an allowance for spiraling in cables from 10 to 50 pairs; 62.58 feet for 100 pair and 62.14 for 200 pair cables.

Q. When should insulated splices ordinarily be used on aerial cable construction?

A. These splices are not being used as extensively at the present time as they were formerly. They should be used at any point it is considered necessary to break the continuity of the cable sheath to reduce current flow which might cause trouble due to electrolysis.

Q. When testing cables by the gas method is there any danger of large lead sleeves expanding from the gas pressure.

A. This is one fault which must be guarded against and in some cases it is necessary to reinforce the sleeve with metal bands. Special bands may be purchased which are designed for this purpose.

Q. Will the use of power saws and drills prove useful in the framing of poles in the pole yard?

A. Yes we would say that power saws would prove useful for this purpose though we would recommend that poles be purchased framed and bored. This method has a special advantage for treated poles as then all cuts being made before the treating process will be fully protected.

Q. What is the approved method of making a section of aerial telephone cable fireproof?

A. This is generally accomplished by stringing an extra messenger strand for the length of the section to be protected and attaching it to the regular supporting strand with 3-bolt guy clamps placed at regular intervals. The cables and both messengers are then covered with a special insulating fireproof material.

Q. What is the so-called "Gulley type" cable and how is it used in the telephone plant?

A. This is a light weight armored cable designed for crossing gulleys, small streams and swamps which may be encountered on the route of a buried cable. This cable provides greater mechanical protection than the ordinary tape armored cable and is lighter and less expensive than the standard wide armored cable of the submarine type.

Aw Gee! I haven't any cable trouble to shoot since we switched to

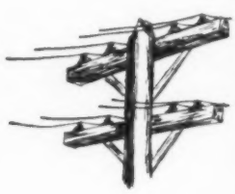
Western Electric

LEAD COVERED CABLE

Distributed by Graybar

For details on Western Electric cable to meet every telephone need, write to Graybar Electric Co., Graybar Building, New York — In Canada: Northern Electric Co., Ltd.

LONG LINES



R. A. Clark, Jr.

Slow Action Relay Circuits

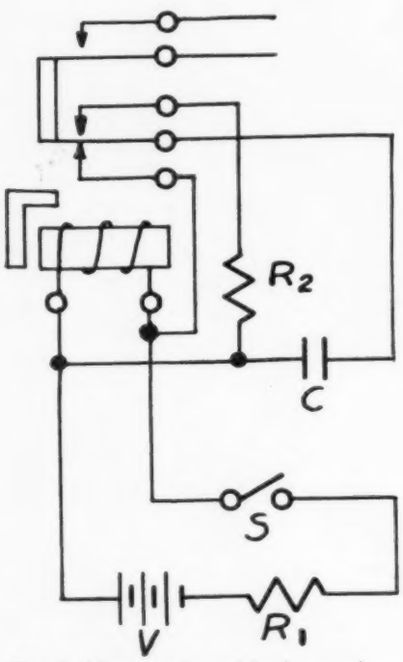


Fig. 1—Slow-operate quick-release relay.

Occasionally there is an application for slow-operate or slow-release relays which cannot be met by means of a copper slug or dash-pot type relay. Two relay circuits employing condensers to obtain the time delay are described in this article. These circuits have been given a thorough field trial and have proven very satisfactory and economical.

The relay circuit shown in Fig. 1 is slow-operate quick-release. The relay is a standard telephone type relay with a high resistance winding preferably 10,000 to 15,000 ohms resistance. Battery voltage of 100 to 200 volts should be employed for the best results, however the values used will necessarily depend on the supply available. Slowest operation is obtained by employing high voltage and a high resistance coil otherwise the condenser sizes become unwieldly. The condenser, C should be of the electrolytic type for reasons of economy. The capacity depends on the required time delay.

The operation of the circuit is as follows: Upon closing the switch (S) current flows from the battery (V) through the resistance (R_1) to the relay winding, however with the condenser bridged across the winding through the normally made contacts, the voltage does not rise until the condenser becomes charged when relay will operate. Upon closing of the relay the condenser is discharged through resistance R_2. The value of R_2 is not critical, 100-200 ohms being suitable in most cases. Upon opening switch S the relay releases immediately.

A relay of the type described above can be adjusted to operate on about 1.5 to 2 MA. Such a relay was used in obtaining the data shown in Table 1. These values are representative of the time delay that can be obtained.

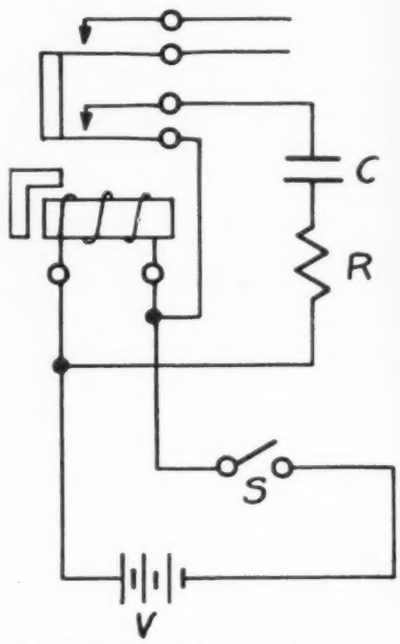


Fig. 2—Quick-operate slow-release relay.

A quick-operate slow-release relay is shown in Fig. 2. The relay is identical with that described above, the condenser size and battery voltage are also similar. Upon closing switch S, voltage is applied to the relay winding and it

Table 1. Slow-Operate Relay Data.

Relay Ohms	Batt. Volts	R_1	C mf	Sec. Delay
11000	160	3500	32	1.0-1.5
11000	160	3500	64	1.5-2.0
11000	160	3500	96	2.0-2.5
11000	160	3500	128	2.5-3.5

Table 2. Slow-Release Relay Data

Relay Ohms	Batt. Volts	R Ohms	C mf	Sec. Delay
11000	160	20000	32	2-5
11000	160	20000	64	3-8
11000	160	20000	96	4-11
11000	160	20000	128	6-14

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It is a common talking, selective ringing system with 10 lines and 2 trunks. It provides local intercommunication and central office service from the same instrument without the additional cost of an attendant operator.

Conveniently located on the base of each telephone are 12 non-locking push buttons which provide for ringing selectively any of the 10 local stations and for answering, holding, transferring or originating central office calls on the 2 trunk lines. All of these functions can be performed from any one of the stations. Each station is arranged for secret service on both central office trunks.

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operates immediataely. When the relay contacts close the condenser C is connected across the battery through the resistance R and beomes charged after a short time interval. When switch S is open the condenser discharges through the relay winding thus holding the contacts closed, the time depending on the values of the condenser and the resistance. Representative values of capacity and resistance for various time delays are shown in Table 2.

In designing slow operate and release circuits the supply voltage is generally fixed. It is therefore necessary to experiment somewhat to determine the values of the condensers and resistors for the desired operation. Attention should also be given to the relay spring tensions and the air gap as these factors play an important part in the operation of the relays.

— END —

Introduce New Pitch Control Device

(Continued from page 23)

the stream proceeds. During most of the speech only one of these two streams is active at one time.

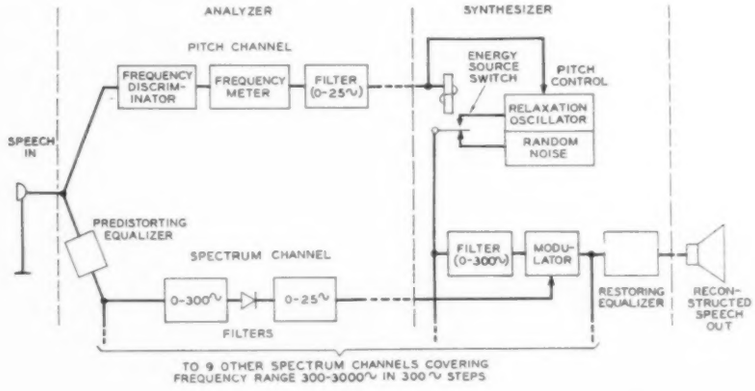
Mr. Dudley proceeded to demonstrate the first-mentioned sound stream, which he designated as "the Buzz." It was a rich full note, something like a muted automobile horn. From this note, electrical filters picked out ten different ranges of overtones covering the gamut of the human voice. The same filters then broke down the second stream — a hissing sound — into ten ranges. These different sounds in their proper proportion form all the sounds of speech. The Voder, astonishing telephone robot at the two World's Fairs, mixes sounds by finger controls. What Mr. Dudley was demonstrating was a circuit which analyzes a voice into twenty parts and then uses the result to control the proper amount of each of the sounds before they reach the loud speaker. A shift in relative amounts was shown to change one vowel into another.

After letting his audience hear a test sentence before and after it had been broken down and put together, Mr. Dudley showed how it would sound when the buzzer alone was used and its pitch was held constant: a flat monotone like a chant. By releasing the pitch, so it could follow the speaker's voice, more naturalness was secured. Normal speech was converted into a whisper when the hiss was substituted for the buzz. While the hiss is relatively faint, it is essential in discriminating between "church" and "shirts," as was then demonstrated.

Speech can also be created out of a complex sound; such as the music of a pipe organ; the organ selection was "The Bells of St. Mary." Modulated by the spoken words of the lyric, the organ then seemed itself to sing.

Expression, said Mr. Dudley, is due to the constant swinging up and down of pitch as one speaks; when the swings are cut in half, the voice seems flat and dragging; when the swings are twice normal, the voice seems more brilliant; when four times normal it sounds febrile, unnatural. The controls can be reversed so that high becomes low: tune of a song is unrecognizable, and speech has the odd lilting character of the Scandinavian tongues. By certain electrical changes, a man's vigorous tones were changed into the quavering voice of a grandfather, and then into the tearful pleadings of a lovelorn girl. The basic pitch of the circuit was set a third higher than that of the singer, who then raised his voice so the audience could hear a duet between man and machine.

As to the engineering possibilities which may grow out of the application of the principles employed in this device, it is hard to predict at the present time. The speech-defining currents do have features of simplicity and inaudibility which may open the way to new types of privacy or to a reduction in the frequency range required for the transmission of intelligible telephonic speech.



Modern Methods of Wire Dead-Ending

(Continued from page 18)

shortened a choking effect is produced which adds unnecessary strain to the dead-end.

THE double tube half-sleeve was used for many years with copper and iron wire for dead-ending. With this method a sleeve the exact size of the line wire should be used. The line wire is first passed through one side of the sleeve, around the insulator and through the other side of the sleeve to form a loose end 6 to 8-in. long. The sleeve is then properly spaced and twisted by three half turns. This twisting should be accomplished with two pairs of splicing clamps, the ones nearest the insulator being held while the other is turned. Some specify that the free end be given two or three loose wraps around the line wire to reinforce and prevent it breaking off at the end of the sleeve.

It is believed that the compression type sleeve dead-end is a big improvement over all other methods previously used for dead-ending telephone lines. They have the advantage of being uniform and all have a strength equal or greater than the breaking strength of the wire itself. This method also has the special advantage that it does not require twisting near the insulators where there is a concentration of strain and the least weakening effect would probably cause a failure. The special tools used for compressing require very little space for operating and may be conveniently used near the insulator on either a bracket or a crossarm.

One compression type of dead-end sleeve is proving extremely popular for terminating iron, steel, copper or copperweld wire on either pin type, spool or strain insulators. This sleeve is compressed with the same tool used for installing this type of splicing sleeve. These offset sleeves are most convenient for the making of dead-ends and no special training or workmen in their use is necessary. Simply pass a sufficient length of line wire through either end of the dead-end sleeve to form the loop which is to encircle the insulator. If a jumper or tail is required pass through enough wire as may be required for this purpose. Grasp the protruding end of the wire and the empty end of the sleeve with the other hand and bend the wire to one side approximately 20 degrees. This angle is not important and depends more or less on the diameter of the insulator being used. In the smaller sizes the dead-end sleeves will also bend. This is desirable as it aids in inserting the wire. In the larger sizes the sleeve bends in line when the load is applied. One compression on each end of a dead-end sleeve is all that is required except on .162 copper, .134 BB steel wire or the new high-tensile strength wire which requires two compressions on each end. This description of using the dead-end sleeves is offered as a suggestion only and need not be followed in detail. Any method which will give equivalent results and meet local conditions will prove equally satisfactory in any exchange.

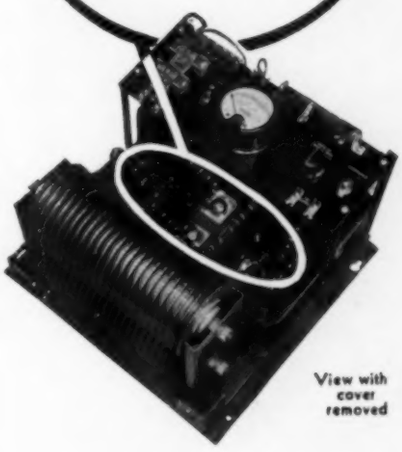
THE jumper wires can be attached to the tails from the dead ends by reducing sleeves which are available for practically all combinations. With the .102" and .114" copper line wires, there is an alternative method of making the connection if it is not desired to use a reducing sleeve. In this case a second offset dead end sleeve is pressed on the tail wire. The free end being too large for the small jumper wire, it is made to fit by inserting a small sleeve, which is sized to the smaller wire, inside the large one. These two sleeves compress perfectly and make a contact which is strong mechanically and entirely satisfactory electrically. It might be mentioned here that the offset sleeve can be used to take a tap off a line wire. In this case the line wire is cut, the offset dead end slipped on and the line wire spliced with a regular sleeve. With the offset in place the drop wire is connected as outlined above.

The double tube type compression sleeve is also satisfactory for wire

A display board of compression type dead-end sleeves, showing how they may be used and tools for their installation.

AC STABILIZER

Raytheon RectiChargeR



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Don't worry about variations in AC voltage. The RectiChargeR is designed to give a uniform output even if the AC varies from 95-130 volts. Battery work is practically eliminated and maximum life is obtained.

A RectiChargeR with a small storage battery floating across its terminals makes a completely automatic AC-DC telephone power unit. The DC voltage is stabilized in the presence of both AC line and DC load variation. There are no moving parts. The RectiChargeR uses dry disc copper oxide rectifying units.

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- No moving parts.
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dead-ending. The regular type splicing sleeve is used for this purpose. This dead-end is made in much the same manner as that used with the ordinary type of double sleeve of the twist type. It has, however, the advantage in that it does not require twisting but is compressed with a special tool. The compression tool is small and may be used close to the insulator or between double crossarms without difficulty. This same type of sleeve can also be used for connecting bridle wire jumpers to the line wire or the tail of the dead-end.

A new type of dead-end of the automatic type has been developed for use with larger sized wires commonly strung for light and power work. So far this type of dead-end has not been constructed for wire smaller than No. 4 though it could no doubt be arranged if there should be a demand for this feature from the telephone field. With this fixture the conductor is securely held by a set of three knurled wedges. The greater the tension on the line the tighter the wedges grip. All parts of the automatic dead-end which hold the conductors are non-corrosive materials and the steel parts are hot galvanized.

There appears to be no convincing argument for not using compression type dead-end sleeves on all open wire telephone work. They provide a uniform and trouble free wire termination at a lower cost than heretofore possible by any method. Linemen prefer them because they are convenient and easy to use. It is believed that all telephone companies will do well to make themselves familiar with this new item of telephone construction material.

— END —

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Appeal Phone Overcharge Claim to Supreme Court

The United States Supreme court on May 13 was asked to review a decision of the Circuit Court of Appeals on Feb. 22 which held that the Illinois Bell Telephone company was entitled to retain $1,688,295 remaining unclaimed from a fund of $18,897,980 ordered refunded to subscribers who paid overcharges.

The appeal was taken by the state of Illinois and the Illinois commerce commission through Attorney General John E. Cassidy.

Telephones in World Gain

Latest statistics of world telephones, covering the year up to January 1, 1939, shows that 2,146,985 telephones were added to the wire networks of the world in 1938, bringing the total up to 39,245,069 on January 1, approximately one-half of which were in the United States.

While the number of telephones per 100 population for the world was 1.79, the United States enjoyed 15.9 and the rest of the world .96 of 1 per cent. Thus the United States total was nearly sixteen times that of the rest of the world. The largest system in numbers of telephones in service outside of the United States was Germany with 3,623,697 telephones in service on March 31, 1938, which is about 5.31 for every 100 persons. Great Britain and Northern Ireland had 3,029,456 telephones in service on the same date, which is equivalent to 6.41 telephones per 100 population.

The best developed countries telephonically next to the United States were New Zealand with 11.97 and Canada with 11.90 per 100 persons.

The American telephone user can reach 93 per cent of the world's telephones, the total of which, it is estimated, will pass 41,000,000 before the end of this year.

J. D. Kennedy Retires

Jerome D. Kennedy, general manager of Western Electric Company's distributing organization, retires on September 1, it was announced June 9.

He will be succeeded by Frederick W. Bierwirth, vice-president of the Company and manager of its Kearny, N. J., Works. Henry C. Beal, now manager of the apparatus and cable division there, will become Kearny Works manager on July 1.

Bell Station Report for May

Telephones in use in the principal subsidiaries included in the Bell system reached an all-time high in May.

Telephones in service increased 73,000 during the month to a record peak of 16,116,050 as of May 31, 1939. This compared with a gain of 24,500 phones in May of last year.

Television Experiment on Telephone Wire

An ordinary telephone line, one of the thousands used every day by New York's millions, has finally transmitted a high definition television picture. The feat, long considered impossible, was accomplished in a National Broadcasting company telecast of the six-day bicycle race at Madison Square Garden over station W2XBS.

As seen in New Jersey, Connecticut, and Radio City, the television images clearly presented the riders as they whirled over the boards or sat in a tent inside the track being interviewed by Gene Hamilton, NBC announcer.

The test was made on a New York Telephone company circuit over a distance of more than one mile. New amplifiers and equalizers, developed by the Bell Telephone laboratories, adapted the telephone line for the uses of television. Engineers emphasized the fact that their apparatus was strictly experimental and that at present they were not prepared to install similar equipment at all New York city telephone exchanges to facilitate NBC's television operations.

Minnesota Exchange Changes Hands

Announcement of the transfer in ownership of the Walker (Minn.) Telephone Exchange was announced recently by M. G. Stokesberry, owner of the exchange for the past 12 years. The new owners Messrs. Stinehagen and Fischer took possession June 1.

Short Course in Telephone Transmission

(Continued from page 20)

This equation separates the constant into two parts, viz: (α) the attenuation constant, and (B) the phase shift constant.

Thus if we have computed or have taken from a table the values of the various factors we can readily determine either the amount of attenuation or phase shift in a line.

To illustrate, from an available table we learn that a No. 104 copper circuit has a propagation constant at 796 cycles of:

$$\gamma = \alpha + jB = 0.00784 + j0.02863)$$

These equations show us that for each mile of circuit the current is 0.00784 times weaker at the end than at the beginning of the mile. The phase shift part of the equation shows us that for each mile of line the phase shifts 0.02863 radians. (Note a radian is equal to 57.296 degrees).

If we wish to convert the attenuation portion of the constant to decibels we can do so by multiplying by 8.686. That is:

db=0.0078x8.686=.068 db per mile

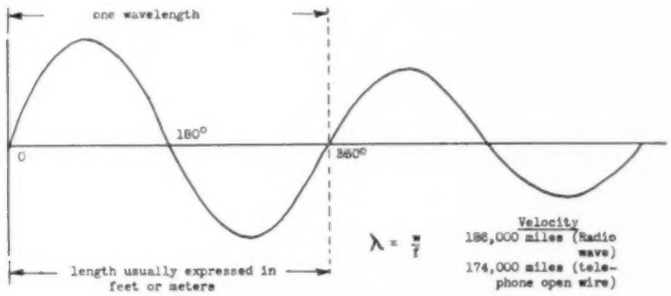


Figure 4—Illustration of the Term "Wavelength."

Effect of Phase Shift

To gain a better physical conception of the effect of phase shift let us examine a long 104 copper toll circuit and determine the phase relationship of the current at various points along the line and at the same instant. In other words, if the current at the input end of the line is just passing through the zero degree phase position, what will it be at some point out on the line at this same instant?

From the table we learned that 104 copper circuit had a phase shift of about 0.02863 radians per mile of circuit expressed in degrees this would be

57.296x.0286=1.63+degrees per mile.

Note—These values are for a frequency of 796 cycles.

Hence, at a point 55 miles out on the line the current would have reached its maximum value when it was at zero value at the input end (1.63x55=90 degrees) At the 110 mile point the current would be just passing through zero and starting the increase in the opposite direction, at the 165 mile point it would have reached its maximum value in the opposite direction while at the 220 mile point it would again be zero.

Figure 2 shows by means of a curve the instantaneous currents at various points along a 220 mile 104 copper circuit. It will be observed that not only is the phase position different at the various points along the line, but the current grows successively smaller as it passes over the line.

In examining the curve shown in Figure 2 keep in mind that this curve shows the relative magnitude of the current (or voltage) at various points along a long telephone line and at one given instant. The current at any point along the line goes through the same cyclic change as at all other points. For example, we stated that at a point 55 miles out on the line the current would have reached its maximum value at the instant it was zero at the input end of the line. This would be true, but one fourth of a cycle later the current would have dropped to zero at the 55 mile point and risen to maximum at the input end of the line. If one will think of the curve shown in Figure 2 as a wave which moves out along the line advancing at a fixed velocity, this will help in getting a proper conception of wave propagation.

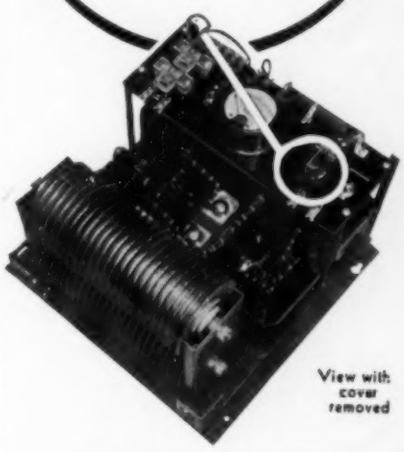
Wave Length

In dealing with long telephone circuits and with almost any type of radio circuits we are often concerned with what is termed the **wave length** of a transmitted wave. Let us see if we can get a good understanding of the physical significance of this term.

We have shown in previous paragraphs that an electrical current requires an appreciable time to travel over a telephone line and that its velocity is different for cable than for open wire. We have also illustrated the point that because of the finite time required for current to travel from one

ADJUSTABLE TRICKLE RATE

Raytheon RectiChargeR



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Don't wait for the expense of short battery life to emphasize the need for an adjustable trickle rate. Buy a RectiChargeR and when you install it, adjust the trickle rate to meet exactly the battery manufacturer's specifications for maximum battery life.

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point to another that the instantaneous magnitude and phase varies at different points along the line.

If we plot the complete shift in phase through 360 degrees we obviously have a picture of one cycle of the wave being propagated over the line. The distance which this wave occupies along the line will depend on two factors, viz: the frequency of the wave under consideration and the velocity at which it travels. The higher the frequency the shorter will be the distance from the starting point to the end of the wave (one cycle). Conversely the greater the velocity the greater will be the distance from the beginning to the end of a single wave.

When we refer to **wave length** we mean the distance from the beginning to the end of a single wave (one cycle). Wave length may be expressed in meters or miles. The wavelength of a 796 cycle wave on No. 104 copper circuit is 220 miles (approximately).

A simple mathematical relationship exists between wavelength, frequency, and velocity, viz:

$$\lambda = \frac{w}{f}$$

Where: λ—wave length in miles
f—frequency in cycles per second
w—velocity in miles per second

Note: Wavelength may be expressed in meters in the above equation provided the velocity is also expressed in meters. Figure 3 illustrates the principal features of this term.

Typical Wavelength Computations

To illustrate the relationship between the three quantities in the wave length equation, let us consider several examples.

First we will compute the wavelength of the 104 copper toll circuit previously referred to. We stated that a 104 copper circuit has a wave propagation velocity of 174,722 miles per second. The wavelength at 1000 cycles would therefore be computed as follows:

$$\lambda = \frac{w}{f} = \frac{174{,}722}{1000} = 174.7 \text{ miles}$$

In a non-loaded No. 19 gauge cable the wavelength at 1000 cycles would be:

$$\lambda = \frac{41{,}000}{1000} = 41 \text{ miles}$$

Wavelength Relationship at Radio Frequencies

It is interesting to note that when we get into higher frequencies of the radio range that the length of a wave can be expressed in feet instead of miles. For example, at 1,000,000 cycles (1000 K.C.) the wavelength would be

$$\lambda = \frac{186{,}000}{1{,}000{,}000} = 0.186 \text{ miles or } 982.08 \text{ feet}$$

If we get down into the ultra-high frequencies as for example 50,000,000 cycles (50 megacycles) the length of the waves with which we deal become unusually short being only:

$$\lambda = \frac{186{,}000}{50{,}000{,}000} = .00372 \text{ miles or } 19.64 \text{ feet}$$

Figure 4 illustrates the difference in length of wave for various types of circuits.

(TO BE CONTINUED)

Book Review

By Arthur L. Albert, *Associate Professor of Communication Engineering, Oregon State Agricultural College.*

This book is designed primarily for use as a college textbook in communication courses and in general electrical courses where electron tubes, circuit theory and transmission theory are presented.

"Electrical Communication" presents the various phases of transmitting intelligence electrically as they contribute to the end desired—that of providing the public with an adequate and economical communication service. The fundamental electrical theory of communication over wires and by radio is treated in a reliable and modern way and is in accordance with the highest engineering standards. In most chapters the use of mathematics has been limited; care has been taken, however, to insure that this has not been accomplished at a sacrifice of engineering exactness. Numerous illustrations and the simple and clear manner in which the book is written add to its interest and instructiveness. Price $5.00. Available through Telephone Engineer Book Dept.

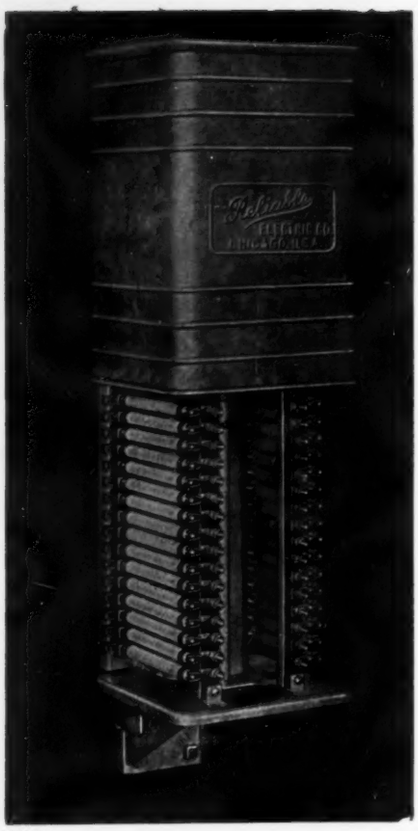
Book Review

ELECTROLYTIC CAPACITORS—
By Paul McKnight Deeley

Last year more than 10,000,000 electrolytic capacitors were employed in the construction of apparatus in the radio, telephone and electrical field. This represents a steady increase in the use of the electrolytic capacitor in the field since 1931. Despite this magnitude of employment of this type of capacitor, very little technical information was ever published on the subject.

In order to remedy this situation, a complete text book on the subject of electrolytic capacitors has been published. This book completely covers, in simple and concise manner, the theory, construction and characteristics, application and testing of all types of electrolytic capacitors.

Two hundred seventy-six pages, one hundred seventy-six illustrations in a size 5½ x 7¾". Price $3.00 through our book department.



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"Tapping In" on Washington

(Continued from page 16)

tailed factual chapters on which the former summary statements are based.

An example of the variations between the different sections of the Report was found in the charge in the general "summary and findings" that "there is evidence to indicate that improper influence has been brought to bear upon legislative and regulatory bodies" and that "this is clearly against the public interest, is condemned and should not be countenanced by any regulatory body." In the chapter on "Public Relations" in the factual portion of the Report, it was cited that "there is some evidence that the Bell System has been active in influencing the actions of legislative bodies charged with the regulation of rates" and other legislative matters affecting Bell variation was interesting because a number of newspaper dispatches on the FCC Report "played up" the alleged political influencing.

There were a number of phases of the Bell System operations, however, which came in for as much attack and censure in the Final Report as they had in the Proposed Report and will undoubtedly be the subject of a counter-assault by the Bell System before the Congressional Committees to overturn the Commission's charge. Among the major points were the allegation that Western Electric Co. had earned excessive profits—the FCC claimed that Western Electric had earned 21 per cent up to 1930 and over its entire history had earned 12 per cent; that the control of patents and their use by Western Electric, because the Bell System companies pay for the patents through license costs and then in turn buy the equipment from Western Electric, may be a violation of the anti-trust laws and that Western Electric cost accounting system does not properly portray the costs of manufacture.

Control of A. T. & T., High Profits, Need for Stronger Regulation

Throughout the FCC report ran several dominant themes—that there was the necessity for strong Federal regulation over the A. T. & T. and Bell System, not only over interstate communications but also to aid state commission regulation and that the FCC should be given adequate personnel and funds to carry out its regulatory program; that the A. T. & T. and Bell System, the largest private corporation in the world, had enjoyed "unusual profits" which has not suffered even in the depression, while Western Electric also had recorded "very large" returns; that the A. T. & T. directs the operations of the Bell System and "the separate corporate of the Associated Companies may be said to be merely a legal fiction from the standpoint of the practical direction of every operating functions of the entire Bell System" and that "the American people are entitle to know if they are being over-charged" for telephone service "even though they may be satisfied with the service."

HE FCC in its report pointed out that the $1,500,000 appropriation for the conducting of the Telephone Investigation—and incidentally, the final report was submitted almost to a day four years from the first hearings of the Investigation—had been amply justified in "dividends" to the public through rate reductions. These rate reductions were claimed by the FCC to have aggregated more than $30,000,000, "directly resulting from the Investigation," and showed "a direct return of more than $20 in savings to telephone users for every dollar that the investigation cost the taxpayers."

The high spots of the Summary and Findings of the FCC Report which was regarded as the most significant portion of the Commission's document were as follows:

Profits of Bell System—The FCC report threw out a feeler that, if business continues to rise, the traffic and plant of the telephone companies will receive greater use and that rates should be reduced voluntarily or by the regulatory bodies or a repetition of the performance of high Bell System profits as existed prior to the depression will occur. The earning record of the A. T. & T. has been "unusually high" and the FCC cited that from 1913 to 1935 the Bell System had averaged over 7 per cent in net earnings. Western Electric profits had averaged over 7 per cent in net earnings. Western Electric profits had averaged over 21 per cent annually on the cash investment of the capital stock—tthe FCC disregarded the return on the plant investment as represented by the funds from "ploughed back" earnings and depreciation reserve.

Bell System Financing—The Report made a "back-door" inference that the $9 dividend of the American Telephone and Telegraph Co. common stock was not now justified on the basis of economic necessity due to cost of money and that the maintenance of that dividend should not be considered as support for the rate of return of operating companies. The report threw out a hint that the Bell System could have obtained a lower cost for the flotation of bond issues if it had engaged in competitive bidding for those securi-

SELF PROTECTION

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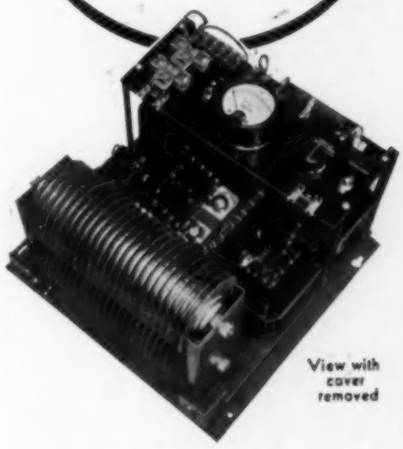

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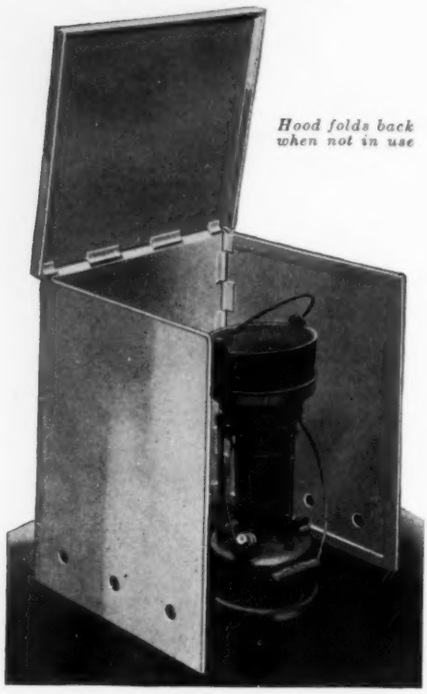

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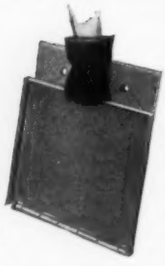

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TELEPHONE ACCESSORIES

ties and suggested that competitive bidding might be tried. It was stressed that J. P. Morgan & Co. and Morgan-Stanley Co. had underwritten nearly all the Bell System bonds issues since 1906.

Management and Control—The FCC report declared that the management of the Bell System has been "self-perpetuating" since 1907 when the Baker-Morgan financial group got control and that the A. T. & T. officers select their own successors and directors. The Associated Bell Companies were charged with being under the absolute control of the A. T. & T. and their separate corporate entities were "legal fictions."

Western Electric Costs and Prices—Two methods of regulation of Western Electric Co. were discussed in the Report which intimated that Western Electric because of its corporate affiliation with the Bell companies was practically a public utility. Competitive bidding was weighed both as to its advantages and disadvantages, without the FCC placing itself on record for or against that method, but it said that "public interest may require competitive bidding." The Commission felt that the entrance of the Independent manufacturers into competitive bidding might bring about lower prices, removal of the control of prices by Western Electric, availability to the Bell companies of the opportunity to buy particular types of apparatus best suited to their needs and an incentive to the Independent manufacturers to develop their own inventions. The disadvantages were that Western Electric, because of its size, would be in a position to permit the Independents to compete on part of their products and could recover its losses through increasing prices on noncompetitive equipment. It was also cited that competitive bidding would be difficult to regulate and administer. The other method of regulation would be the control of prices through an accurate and comprehensive accounting system which would permit the regulatory agency to determine whether the prices and costs were reasonable.

Engineering and Standardization and Research—On these two subjects the Commission took a counter position to the Walker Report and praised both these functions of the Bell System. Engineering and Standardization were regarded as having been tremendous factors in producing the high quality of service and its overall results, even though hind sight might have brought out some errors and delays in installing new inventions, justified the continuance of these practices. Research was deemed essential to the improvement of the telephone service and the FCC stated that "no criticism" could be directed against research expenditures for improvement of telephone service. In research the FCC report did suggest that profits from non-communications devices could be diverted to the telephone companies to pay for any fundamental research in the development of those inventions. The Final Report gave its highest praise to the telephone service in these two chapters and apparently reversed the positions in the Proposed Report in many major circumstances.

License Service Contracts—Commission report proposes that the A. T. & T. in its accounts should show the disbursements under license service contracts—made by it for operating companies and disbursements assignable to it for its corporate activities as a holding company.

Depreciation—Commission indicates that as a practical matter it will not attempt to fix specific depreciation rates for all classes of depreciable property for all companies.

Separation of Property—Simple and equitable method of allocating interstate toll, intrastate toll and exchange property, revenues and expenses must be formulated, the Report cited. Station-to-Station theory seems to be the prevailing view of the Commission.

Public Relations—The Commission proposed that regulatory bodies should question the expenditures by the Bell System, which it claimed had been very sizeable, to get good will for the telephone industry.

Non-communications Activities—In an entirely opposite position from the Walker Report, the Commission report held that it was the "duty" of the A. T. & T. to exploit the devices in non-communications activities de-

SAFETY BULLETIN

If a telephone plant man is out on a job with such necessary safety devices as safety belt, rubber gloves, handline, goggles, etc., etc., and has need of them what is their value to him.

They have no value to him as a safeguard against possible personal injury unless they are where he can use them. If he takes a chance and is injured some one may have to call an ambulance. It is most advisable to use all safety devices for each class of plant work.

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- **Telephone Transmission—Theory and Practice** R. A. Clark, Jr. 2.50
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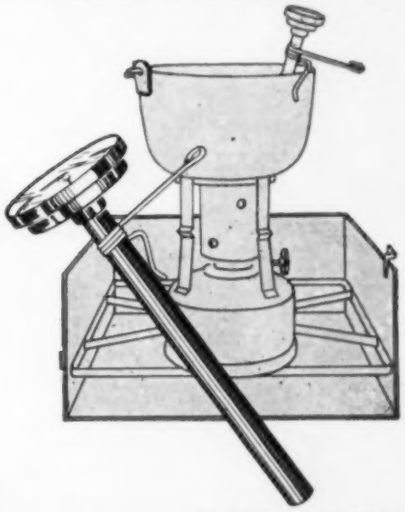

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veloped through telephonic fundamental research.

Elimination of Competition — The Commission report stated that it was futile to set up at the present time a strong Independent telephone system to compete with the Bell System—the FCC used this fact as a potent argument for the expansion of its regulation over the Bell System as a monopoly. Since the 1922 Hall memorandum the FCC stated that the relations of the Bell System and Independents have been more cooperative, citing that the Independents had "lobbied" for the Bell System, but in regard to acquisitions and divisions of tolls there was still disagreement.

Senate Telegraph Industry Inquiry to be Most Important

A MOST interesting and important survey of the communications industry with practically the entire emphasis on its telegraphic branch is slated to be launched by the Senate through its Interstate Commerce Committee during the fall and highly significant legislative recommendations, aimed to pave the way for a merger of Western Union and Postal Telegraph, then will be submitted to the next session of Congress.

The telegraph industry inquiry by the Senate committee was proposed in a resolution by Chairman Wheeler of the Interstate Commerce Committee which after its approval by that body was expected to be passed without opposition by the Senate (according to the outlook at the writing of this column). Hearings are planned to start during the latter part of September and the Senate Committee plans to be in a position to submit its recommendations at the next session by Jan. 5, 1940, its opening.

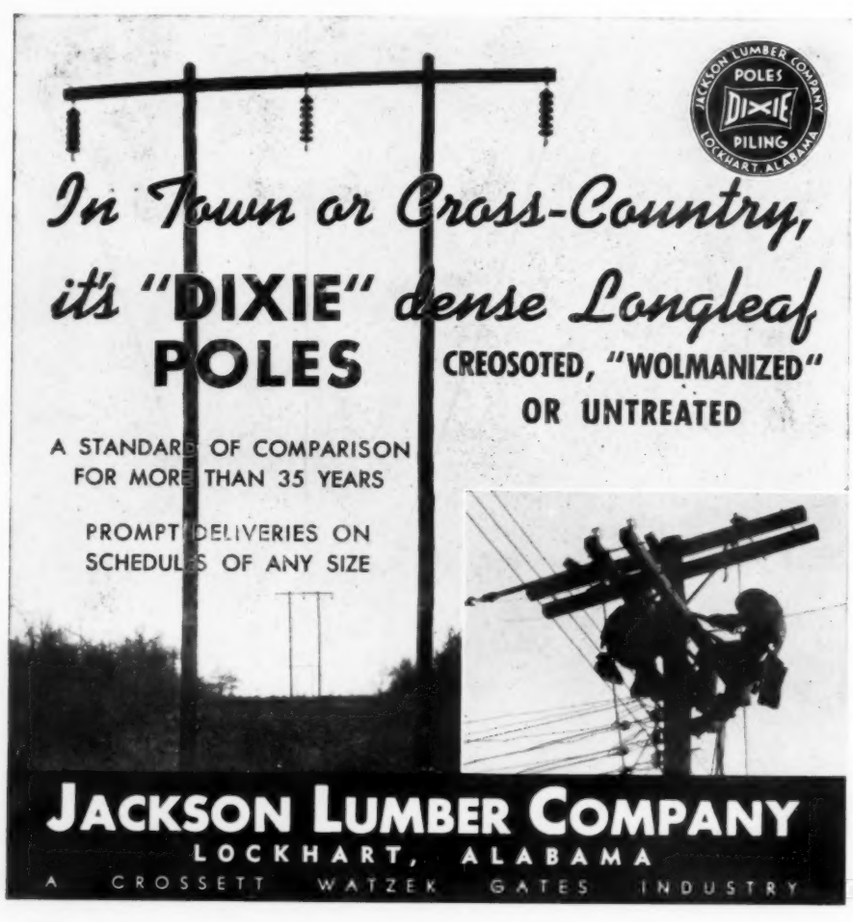
The spotlight is to be centered on the domestic landline telegraph industry with the affairs and troubles of Western Union and Postal Telegraph as the principal subject. But the telephone industry has an important role as Senator Wheeler is anxious to probe into the effect of the teletypewriter exchange and private services of the American Telephone and Telegraph Co. and the Bell System which touches to some degree the Independent industry wherever the TWX service is operated in the latter territory. No delving into the telephonic operations of the telephone industry is projected but the study is to be concentrated on the record or telegraphic sides of the field. The only observation of telephonic services probably will come in the comparison of the long distance telephone usage with the telegraph communications desires of the public to illustrate the former service's competitive powers.

The Senate committee membership which will make the inquiry has not yet been designated. It is possible that Chairman Wheeler may take over the investigation helm for a time at least. But the committee's ranking Republican, Senator Wallace H. White, Jr. of Maine will be the inquiry's major figure as he is regarded as the ablest and best grounded observer of communications in Congress.

While the feasibility of drafting legislation to permit a merger of the Western Union and Postal Telegraph to waive the anti-trust laws' application just as was afforded the telephone industry in the 1921 Graham Act is the main goal of the Senate inquiry, international communications in the form of the cable and radiotelegraph companies—Western Union, Commercial Cables, All America Cables for the cable service and RCA Communications, Mackay Radio and other wireless companies—is also to be investigated to determine desirability of consolidations in that field. A merger of the international communications companies into a single cable carrier and into one radiotelegraph entity has viewed by many important communications observers as a logical step for more economical service to the public and more valuable in national defense—such a consolidation, according to some observers, could be carried still further to place all cable and radiotelegraph carriers under one corporate roof.

EVEN if Congress at the 1940 session should enact a law to permit the merger of telegraph companies, it would probably take a long time before the carriers could be consolidated. The process of the evaluation of the properties and the division of the assets to satisfy the investors is a complicated and lengthy procedure. Another major cause of delay which might in itself be a stumbling block in the path of a successful merger would be the protection of the displaced telegraph employees.

In the event of a Western Union-Postal Telegraph consolidation there would be approximately 17,000 Postal employees whose positions would be endangered. Some would be absorbed in the new consolidation, but a large proportion would be displaced if the new company was expected to operate profitably. The labor situation has been brought to the attention of the Senate as the major problem of a merger by the labor unions, especially the CIO's which was the main sponsor of the American Communications Association Wheeler investigation resolution. The



CIO union wants Congress to safeguard the displaced employees with mple dismissal pay.

In describing the situation of the telegraph industry, Senator Wheeler declared that Congress has an opportunity to chart a future course for that branch om communications before it is too late as seemed apparent in the comparable plight of the railroads. The Senate Interstate Commerce Committee Chairman, who outlined his views on the telegraph investigation in a two-day preliminary hearing in the latter part of May, cited that the landline telegraphs were facing modern "streamlined" competition in the telephone, air mail and radio services. He posed several questions to be considered by the Senate inquiry—whether the present telegraph companies can profitably continue and prosper under proper supervision; should the landline telegraph systems be consolidated; should the landline and international systems be consolidated; should the landline and international telegraph systems be consolidated into one gigantic monopoly; should each of the three types of communication — written, oral and radio—be confined to prescribed limits of activity.

A NUMBER of government officials endorsed the Senate inquiry at the prelimary hearing. The Justice Department cited that it was a necessity and should not be delayed and that the department did not feel such a consolidation would be contrary to the anti-trust laws because a single telegraph monopoly would face the stern competition of the long distance telephone and the air mail. FCC Commissioner T. A. M. Craven urged the Senate to produce out of the inquiry a "national communications policy" and cited that, unless a merger occurred, the present trend of the telegraph industry was towards a gigantic monopoly with the telephone industry. U. S. Bureau of Labor Statistics Commissioner Lubin, who made a surprising declaration that the Wage-Hour provisions had threatened the telegraph industry with "red" financial results, thought that some of the savings through the abandonment of competitive operations could be used to take care of the displaced labor. Admiral S. C. Hooper of the Navy and Major General J. O. Mauborgne, Chief Signal Officers, view the telegraph service as highly valuable for national defense.

FCC Seeks Rush 1940 Appropriation; Extend Continuing Property Report

THE FCC with funds running short at the end of this fiscal year on June 30 was hoping to avoid financial starvation with an eleventh-hour passage of its appropriation for 1940 by Congress in the Third and final Deficiency bill. The FCC did not seek an increase in its 1940 funds as it had in the early stage of Congress. The Commission only asked for the same appropriation—$1,700,000—as it had during the current 1939 fiscal year, while in the early days of Congress it had requested an increase of $300,000. The FCC hopes to obtain additional funds in a deficiency appropriation at the next session of Congress.

So that the state commissions can have further time to formulate the final rules and policies, the FCC has extended for another year—to June 30, 1940—the completion date of continuing property records under the Uniform System of Accounts for Telephone Companies. The completion had been previously fixed for June 30, 1939, on telephone plant changes between Jan. 1, 1937 and December 31, 1938.

—END—

Handset Charge Discontinued

Discontinuance by Southern Bell Telephone and Telegraph company throughout Alabama of the monthly extra charge for handset telephones, was announced in May by the State public service commission.

In compliance with a request of the California Railroad Commission, officials of the Southern California Telephone company announced recently that the additional hand set charge in California exchanges will be discontinued, effective with the bills issued to subscribers on and after July 1.

Obituaries

James S. Hartnett of 38 Conyingham Avenue, West New Brighton, S. I., general service manager of Bell Telephone Laboratories, Inc., died May 1. Mr. Hartnett, who was 46 years old, had taken the Seventh Avenue subway at Fourteenth Street and suffered a heart attack when approaching Chambers Street. He died at the Chambers Street station.

P. G. Rogers, 64, who retired last December after more than forty-eight years service with the Southwest Bell Telephone Company, died April 26 at a Sherman (Texas) hospital after a heart attack.

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Even if you are at fault DORSON will service or replace at no charge. We take full responsibility for your timing problems and ask you to try TOLL TIMER in your exchange. Of course you will not be obligated in any way. All we ask is that you give TOLL TIMER a trial.

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Expanding or Cone Anchor installations are made easier, better, quicker and cheaper with the Chance destructible nut retainer because it prevents the anchor from riding up the rod and makes it possible to keep the hole to the minimum size giving greater anchor efficiency. The destructible feature makes it possible to drive the rod into the ground if anchor and rod are to be abandoned or the rod can be screwed out and salvaged.
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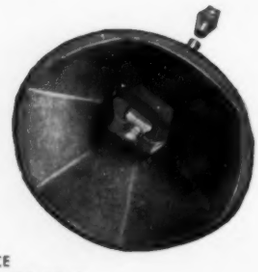

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CENTRALIA
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Stromberg-Carlson Sales Representatives and Officials at Hotel Sagamore, Rochester, N. Y., during the Company's recent Annual Sales Conference on the 45th Anniversary of the Stromberg-Carlson Telephone Mfg. Co.

STROMBERG-CARLSON HOLD SALES CONFERENCE

TELEPHONE sales representatives of the Stromberg-Carlson Telephone Mfg. Co. from all over the United States and Canada gathered May 12th at the Hotel Sagamore, Rochester, N. Y., for the company's annual sales conference.

E. A. Reinke, Commercial Sales Manager and Chairman of the meeting, declared it was the most enthusiastic Stromberg-Carlson sales meeting in the past ten years. He reported a steady growth in the volume of business and predicted an even larger growth for this year, the Company's 45th, due to outstanding engineering advances and gearing of the factory to increased production.

Delegates were welcomed by Stromberg-Carlson's president, Wesley M. Angle, who gave the floor to Sales Manager Lloyd L. Spencer who inspired the gathering with his enthusiasm for the work Stromberg-Carlson was doing for the Independent Telephone Industry.

George A. Scoville, Vice-president and General Manager, presented a summary of developments in the telephone field and outlined the policies of stromberg-Carlson. He praised the work of Stromberg-Carlson's development engineers in perfecting more efficient, though much smaller parts, which made possible the highly perfected self-contained handset telephones Stromberg-Carlson is marketing today. Mr. Scoville discussed merchandising activities and presided over an open discussion of sales problems.

Dr. Ray H. Manson, Stromberg-Carlson Vice-president and Chief Engineer, points to the new Stromberg-Carlson Capacitor as he explains to delegates how Stromberg-Carlson's Radio Experience has lead the way to more efficient, more compact telephone parts.

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For better and cheaper ringing.
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Declaring the application of Stromberg-Carlson's radio experience to telephone design had produced an unparalleled instrument, Dr. Ray H. Manson, Vice-president and Chief Engineer, pointed out the accomplishments of the Stromberg-Carlson acoustic laboratory's work along these lines.

C. E. Heston, Assistant Telephone Sales Manager, gave a presentation of the 1210 and 1212 Handsets which embody the improvements developed by Stromberg-Carlson.

Mr. Reinke, before entering a discussion on Stromberg-Carlson switchboards, stated that the firm's switchboard business had shown continued growth each year since 1933.

SUPPLEMENTING Mr. Reinke's remarks Stuart Beecher of the Strom-Carlson Telephone Sales Department outlined the tremendous and varied uses for the firm's 2-6 and2-10 telephone systems. He said any business or institution too small to require a P.B.X. switchboard, and too large to find a single trunk and one or two extensions satisfactory was a logical potential user of them. To show this, he pointed to dozens of installations made in the past few years to estates, theatres, schools, hospitals, garages, clubs, hospitals and varied small business organizations.

He described the 2-6 and 2-10 systems as simplified common talking selective ringing telephone systems with two trunk and 6 or 10 lines as the case may be, providing local intercommunication and central office service from the same telephone without the services of an attendant operator.

Further talks on switchboards were given by R. H. Barger, Sales Engineer, W. J. Pfaender, Illinois Representative, and W. C. Caldwell, Minnesota and Dakotas Representative.

Mr. Pfaender described the Stromberg-Carlson No. 105 Magneto Switchboard and told his experience with its wide adaptability. He said it could be adapted not only to any type of magneto line, but to any size of magneto exchange.

Mr. Barger told of the engineering features of the Stromberg-Carlson No. 106 P.B.X. Switchboards, and was followed by Mr. Caldwell, who, having placed dozens of these boards, enthusiastically outlined its superiorities.

The final part of the program before general discussions took place was given over to a talk on supplies and materials by Stromberg-Carlson's Vice-president in Charge of Production, E. A. Hanover.

During the convention, one minute's silence was observed as a tribute to Ben Woodbury.

Station Report

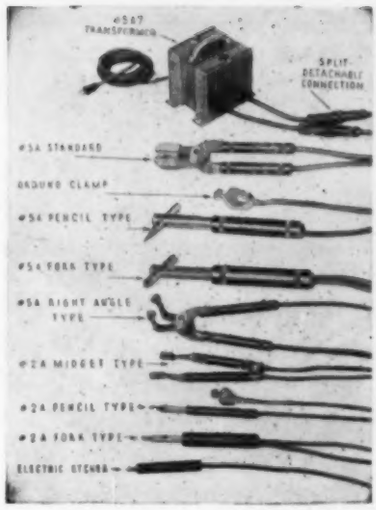
General Telephone Corporation reports for its subsidiaries a net gain of 3,405 company-owned telephones for the month of May, 1939, as compared with a net gain of 2,388 telephones for the month of May, 1938. The net gain for the first five months of 1939 totals 11,169 (exclusive of sale of 843 telephones) or 2.53% as compared with a net gain of 7,683 telephones or 1.73% for the corresponding period of 1918.

The subsidiaries now have in operation 470,433 company-owned telephones.

New Product

A new line of Electric Soldering Tools, utilizing a small transformer and carbon resistance elements to produce heat, is now being offered. This equipment is very well suited for use in the telephone field for soldering terminals on relays, panels and control equipment.

These Thermo-Grip Tools offer a number of very fine and exclusive advantages. They heat instantly—draw current only when in actual use—give controlled concentrated heat—may be laid down anywhere without requiring a special holder and are extremely convenient to use. In short, their use results in clean, quick, safe and economical soldering work.



Thermo-Grip Tools are particularly well suited for maintenance and emergency work, because they are ready for instant use as soon as they are plugged into an electrical outlet. Often with a Thermo-Grip a job can be soldered and finished before other types of soldering equipment can even be brought up to the necessary temperature.

They are available in a wide variety of models. Consequently there is a Thermo-Grip Tool for almost every soft soldering application.

An up to date book illustrating and describing this equipment and giving

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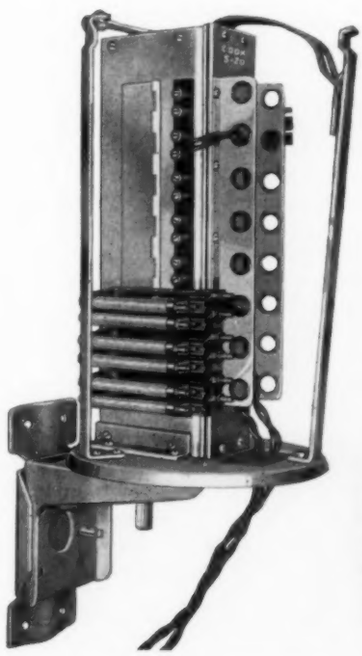

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New Wire Data Book

A galvanized telephone line wire with a minimum breaking strength two and one-half times that of standard B. B. grade is the newest product of Indiana Steel & Wire Company, pioneers in the development of high tensile telephone wire.

Spans of 350 feet in heavy loading districts, 450 feet in medium loading districts and 500 feet in light loading districts are practical with this high strength wire. It is offered to the telephone industry only after more than 10 years' research and experiment and three years' actual use in the field.

This recent development, which bears the trade name Crapo HTL-135, is said to possess a combination of tensile strength and voice transmission qualities never before attained in an iron or steel wire designed for telephone use. Extensive tests at 1000 cycles per second with currents of voice frequency magnitude show this wire to have a lower transmission loss per mile than B. B. wire.

Because of its adaptability to extra long-span construction, Crapo HTL-135 opens up new possibilities for the extension of rural telephone lines. Remote areas which formerly could not be reached economically may now be served profitably through the use of longer-span, lower-cost construction made possible by this extra high-strength wire.

A compilation of engineering data and construction practice information relating directly to Crapo HTL-135 high-strength line wire has been published in booklet form by the manufacturers. Included in the contents are facts about the physical characteristics of this new wire, its transmission efficiency, sag and tension data and range of span lengths. Tables of stringing sags for long spans in each loading district are presented for the guidance of users.

A section on construction practices illustrates and describes proper methods for installing Crapo HTL-135 in long-

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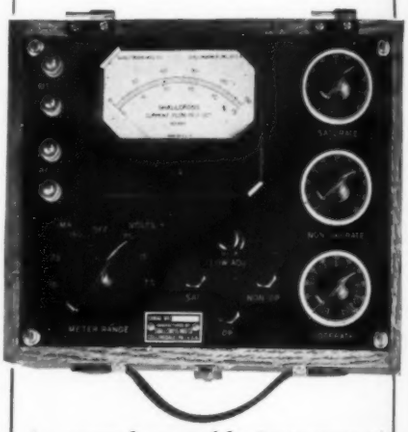

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span lines. Copies of this booklet (Bulletin No. 202) can be obtained by writing direct to Indiana Steel & Wire Company, Muncie, Indiana.

Crapo HTL-135 is the second high tensile telephone line wire to be produced by Indiana Steel & Wire Company. A companion product known as Crapo HTL-85 has a minimum breaking strength of 793 pounds (No. 12 B.W.G.). Where Crapo HTL-135 makes possible spans of 350 feet in heavy loading districts, Crapo HTL-85 permits spans up to 225 feet. The latter has been adopted by a number of companies for use on existing pole structures because it withstands heavy ice and wind loads, minimizes service interruptions and tends to lower maintenance costs.

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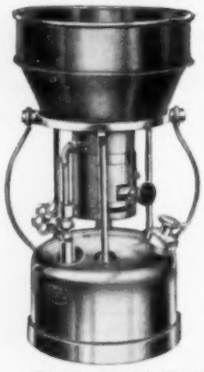

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